# KD™ अभिज्ञान

*A Chronicle of Our Endeavours*

Issue : 2 August, 2019

HOPE HEALTH HAPPINESS

## VISION

Ensuring ‘well being’ as a humane commitment to enliven humanity.

## MISSION

The ‘well being’ ensured by extension of Available, Accessible, Affordable, Safe, Efficacious, Professional and Ethical comprehensive healthcare through state-of-art facilities.

# CONTENTS

# Letter From The Managing Director

Dear Colleagues,

After introducing the first edition of KD Abhigyaan, we take the academic pursuit of KD Hospital further and bring forth clinical excellence cases done at our hospital and share knowledge in the form of original articles, review articles, case reports, and photoassays presented by our consultants.

*"Gaining knowledge is the first step to wisdom,*
*Sharing it, is the first step to humanity"*

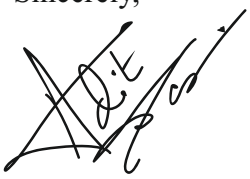
As we aim to ensure "well being" as a humane commitment to enliven humanity, by sharing these articles and cases we create awareness about the type of cases treated by our consultants and introduce you to the state-of-the-art facilities that are available at our hospital. It is an endeavour to highlight the laudable work done by our dedicated and hard working staff and doctors while following ethics and providing comprehensive healthcare.

*"Sharing knowledge is a reflection of teamwork and leadership"*

Our team comprises the best leaders in healthcare and we have tried to include all our latest academic pursuits in this edition. We hope that it will not only add to your knowledge about the cases and the articles discussed but also make you more familiar with our hospital.

Our multidisciplinary team of doctors and staff are available any time at your service and our state-of-the-art facilities are one of their kind in the country. You can approach us anytime or get back to us with your suggestions and feedback.

Sincerely,



Dr Adit Desai
Managing Director
KD Hospital
Ahmedabad

# Letter From The Academic Head

Dear Colleagues,

Thank you for appreciating the first edition of KD Abhigyaan and we hope that the present edition will also be of interest to you as it is our pursuance to disseminate information and medical insights into the ongoing clinical care provided at the hospital. The purpose is to bring forth the commendable work done by our doctors and staff and to update the knowledge of the medical fraternity so that the quality of care delivered to the patients can be improved.

*"Disseminating knowledge is a human duty as sharing it helps all to benefit."*

This is a compilation of some rare or noteworthy cases of patients diagnosed and/or treated at our hospital, photoassays of some interesting findings, review articles to enhance your knowledge on a particular aspect of the department or updates in technology. We have maintained transparency and patient privacy while sharing these cases and articles.

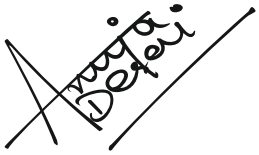
Through this healthcare publication we share the experiences and ideas so that the knowledge base can be expanded to provide the best possible care to the patients. We believe that:

*"Learning multiplies with the number of people we share it."*

We also conduct CMEs and health talks along with paramedical and nursing courses to expand our academic endeavours. The joint efforts and dedication of our team of doctors, staff, and management supported by the infrastructure and state-of-the-art facilities provide us ideal conditions to pursue these academic pursuits.

I, on behalf of the Editorial Board, appreciate the efforts of our highly qualified and proficient consultants for sharing these articles while harbouring a sincere desire to deliver high quality care to the patients. We hope to move forward on similar lines in future also towards our mission so that our vision can become a reality.

Sincerely,



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# Letter From The Chief Operating Officer

Dear Associates,

KD Abhigyaan has already been introduced as one of the academic pursuit by KD Hospital in its first edition and now we welcome you to its second edition. The vision that led to its emergence is based on sharing knowledge as we believe that:

*"Knowledge alone is not power,*
*It is sharing of this knowledge that multiplies its power."*

With our different centres of excellence, health checkups, and emergency services we aim to make healthcare approachable and accessible to all. Similarly, we also wish to excel in the academic front by conducting different CMEs and academic courses.

The patient feedbacks provide us insights into new ways of improving patient care and facilities and highlight the efforts of our hard working and dedicated team of doctors, staff, and management. Our infrastructure and state-of-the-art facilities are highly appreciated by our patients and help us effectively treat and manage them.

In this edition, the different academic activities and unique cases and articles by our consultants are included to bring forth the clinical and academic excellence we aim to achieve as a part of our humane commitment. Due care of ethics and patient confidentiality is taken care of during these discussions.

We hope this edition will supplement your knowledge with the different cases, articles, and photoassays and make you more familiar with our hospital, our multidisciplinary team of doctors and staff, and the different state-of-the-art facilities available.

Do get back to us with your suggestions and feedback.

Sincerely,

Dr Parth Desai
Chief Operating Officer
KD Hospital
Ahmedabad

# Successful Medical Management Of Acute Bilateral Emphysematous Pyelonephritis With Cystitis: Changing Treatment Perspective

**Dr Hardik Yadav** (MCh)
**Dr Jay Patel** (DM)
**Dr Sneha Patel** (MD)

Case Report

## Abstract

Bilateral Emphysematous Pyelonephritis (EPN) is a rare life-threatening condition with high mortality that requires prompt diagnosis and early intervention. Desperate surgical measures lead to loss of renal unit, but medical management often combined with percutaneous drainage, is sometimes successful in properly selected cases. We present the case of a 45-year-old diabetic woman who developed bilateral EPN with emphysematous cystitis (EC) and uraemia that was promptly diagnosed clinically and radiologically and successfully managed medically with antibiotic therapy alone. Clinical picture improved within 48 hours after control of diabetes and with broad-spectrum antibiotic treatment alone.

## Introduction

Emphysematous Pyelonephritis (EPN) is a rare necrotising infection with a variable clinical picture ranging from mild abdominal pain to septic shock. It is a life-threatening condition that usually affects patients with diabetes.[1] Traditionally, surgery was considered mandatory and the treatment of choice. Bilateral EPN is extremely rare, accounting for approximately 10% of EPN cases[2] and surgically treated patients require long-term dialysis. If left untreated the outcome has been found to be fatal usually. With advancements in urology, alternate treatment option is percutaneous drainage (PCN) and/or stent drainage along with good antibiotic coverage leading to increased renal salvage even in patients with bilateral EPN. We present an additional case of bilateral EPN with emphysematous cystitis (EC) in a woman who was treated successfully with antibiotics alone without any stent placement or PCN which is one of the few cases reported.

## Case

A 45-year-old female was diagnosed with diabetes a year ago and was admitted to the uronephrology division of our hospital with a one-week history of fever, vomiting, and abdominal pain. At presentation, she had a temperature of 101°C and tachycardia (122 beats/minute) with normal blood pressure and oxygen saturation. Blood tests revealed a haemoglobin level of 8.7 gm/dl, WBC count of 17,000 cells/mcL, Platelet count of 3,72,000 cells/mcL, S. creatinine level of 3.08 mg/dl, Blood urea-76 mg/dl, random blood glucose level of 598 mg/dl, and glycosylated haemoglobin A1c (HbA1c) of 13.1%. Ultrasonography of abdomen revealed bilateral bulky kidney with air foci in bilateral renal collecting system and changes of cystitis [Fig.1,2].

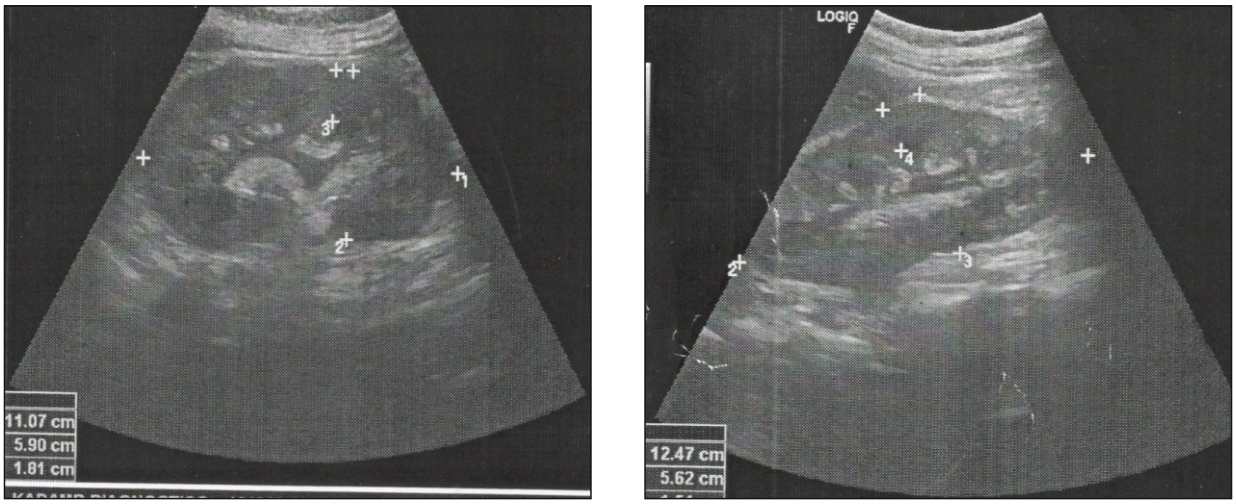


Figure 1,2 - Air foci in bilateral renal collecting system and changes of cystitis as seen before treatment

Plain CT KUB showed multiple air foci in bilateral pelvicalyceal system, ureter, and bladder suggestive of EPN and cystitis EC. No intraparenchymal or perinephric gas or collection and no evidence of stone or significant hydroureteronephrosis [Fig.3,4,5].

Conservative treatment was planned and intravenous (IV) antibiotic, meropenem 1 gm, and IV fluid was started. Blood glucose was controlled with insulin. We planned to consider stenting or percutaneous drainage if the patient's condition showed no improvement with antibiotic alone within 48 hours. Subsequently, E. coli was found to be positive in the urine culture and after the drug susceptibility test results, IV antibiotic was continued for 14 days. The patient's clinical condition improved remarkably over the second day of treatment,

thus obviating the need for any stenting. On the third day, blood tests revealed haemoglobin level of 8.0 gm/dl, WBC count of 13,300 cells/mcL, platelet count of 3,47,000 cells/mcL, and S. creatinine level of 2.3mg/dl. On the seventh day, blood tests revealed haemoglobin level of 7.8 gm/dl, WBC count of 10,000 cells/mcL, platelet count of 4,40,00 cells/mcL, and S. creatinine level of 1.3 mg/dl. The patient was asymptomatic throughout his hospitalization and a follow-up USG scan obtained 7 days after the initial study showed global improvement with marked reduction of the gas within the kidneys [Fig.6,7].

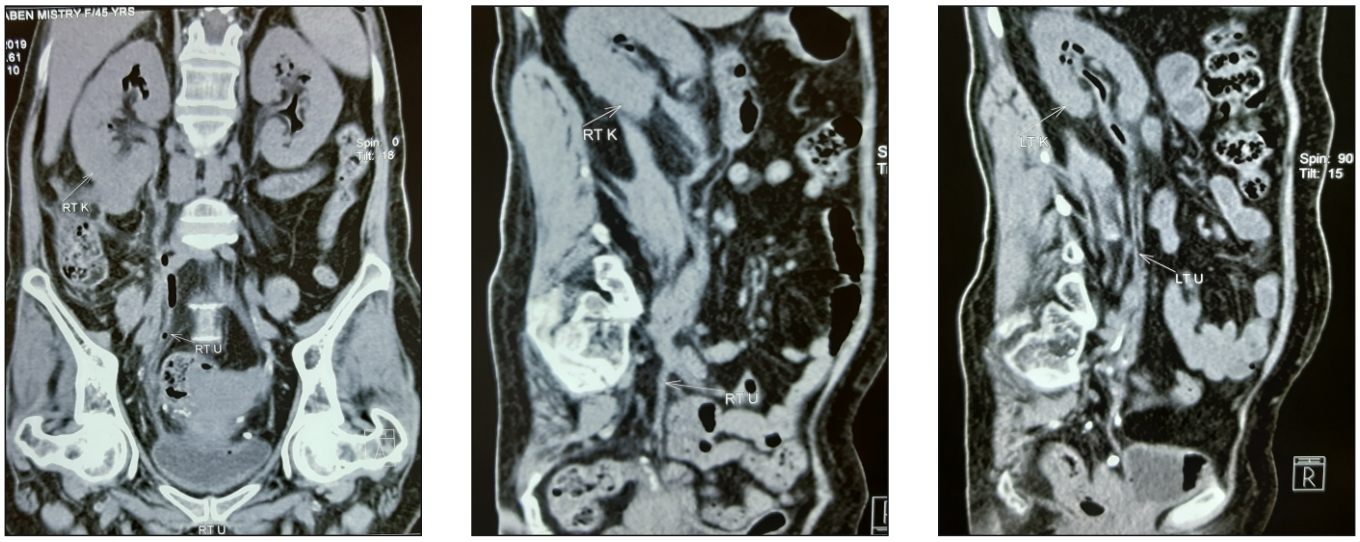


Figure 3,4,5 - Multiple air foci in bilateral pelvicalyceal system, ureter and bladder

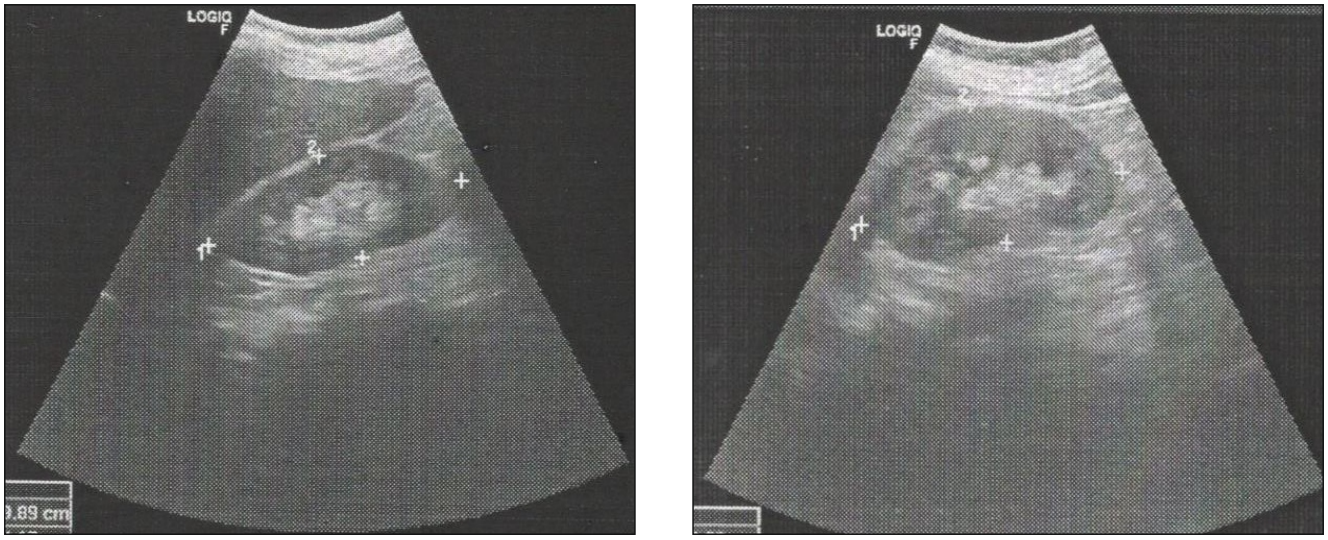


Figure 6,7 - Normal right and left kidney with no air foci

After two weeks of admission the patient exhibited steady clinical recovery and the antibiotic was switched to tablet levofloxacin (500 mg) and was administered once daily orally. Clinical review revealed that she was clinically well and free of infection.

## Discussion

EPN is an acute necrotizing parenchymal and perirenal infection caused by gas forming uropathogen. Traditionally, it was thought that antibiotic therapy alone is usually ineffective and prompt nephrectomy is necessary.

In the present case, poor regulation of diabetes mellitus (DM) was the only predisposing factor observed as her HbA1c on arrival was 13%. This was most likely due to noncompliance with her medication. This reinforces the observation by several studies that DM is the most prevalent comorbidity in EPN patients. E. coli was the organism cultured from her urine sample. The largest series about treatment strategies of EPN was reported by Olvera-Posada *et al* and they recommend combining different minimally invasive strategies before emergency nephrectomy (EN).[3]

In a meta-analysis of 628 patients from 32 studies Aboumarzouk *et al* noted that 45% of the patients had PCN, 26.6% were managed conservatively with medicines, 20% had EN, and 2.8% had open drainage.[4] The study further revealed that PCN and MM were associated with significantly higher survival rates than EN, thus concluding that EN should be the last option in the management of EPN patients.

Frimpong *et al* in their review reported 25 cases of bilateral EPN who were chiefly treated by conservative medical management which included antibiotics (n = 24, 96%), PCN (n = 7, 28%), double J stent, with additional therapy for glycaemic control in diabetic patients. Surgical treatment was implicated in 4 patients (16%) and included only nephrectomy.[2] One patient out of the 25 selected EPN cases died. This supports several studies that have reported successful medical management of EPN thus eliminating the need for long term haemodialysis associated with surgical treatment.

Previously reported cases of bilateral EPN that were successfully treated with antibiotics alone, thus obviating the need for renal replacement therapy which would have been needed if they were treated with bilateral nephrectomies.[5-7] This coincides with the observation by Olvera-Posada *et al*. that the prognosis of patients with emphysematous pyelonephritis has changed over the last years, with a decline in mortality resulting from improved MM and minimal invasive strategies together with the widespread adoption of PCD and double J stent placement.[3]

In the present case the patient was conservatively managed with antibiotics. However, due to the presence of hyperglycaemia, human insulin analog and later on metformin were prescribed to achieve appreciable glycaemic control. The patient in the present case was diagnosed with the aid of CT scan, and was successfully treated with only antibiotics in a bilateral EPN, a condition in which treatment traditionally involved antibiotics and other additional interventions including nephrectomy. We believe that nephrectomy is not the preferred treatment anymore for all cases of EPN and it shall be classified into grades of severity and treatment planned accordingly. Although difficult to perform because of the rarity of EPN, randomized controlled studies for management of EPN are greatly needed.

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# Incidentally Detected Hepatocellular Carcinoma And Its Follow Up Imaging After Radiofrequency Ablation

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**Dr Masum Shah** (MD)
**Dr Yash Patel** (MD)

Case Report

## Abstract

Hepatocellular carcinoma (HCC) is major cause of mortality and fifth most common malignant neoplasm. Major predisposing condition for HCC is underlying liver cirrhosis. Radiofrequency ablation (RFA) has shown itself to be a more promising technique than other minimally invasive techniques for suitable liver lesions including HCC. Post RFA follow-up imaging (preferably multiphase CT) is essential to look for the effect of ablation and see the normal as well as abnormal findings or complications.

## Introduction

Hepatocellular carcinoma (HCC) is fifth most common malignant neoplasm worldwide and major cause of mortality. Imaging plays a major role in early diagnosis and management of HCC.[1] In cirrhotic liver, ultrasonography (USG) is still sensitive enough to identify the focal lesion. However, USG has limited role in differentiation and characterization of focal lesions (predominantly differentiating HCC from dysplastic and regenerative nodules).[2,3] In such instances, multiphasic CT or MRI is the investigation of choice, depending on the availability, technical expertise, and other co-morbid conditions.[1]

Various therapeutic options are available for HCC.[3] Surgical resection, minimally invasive procedures like radiofrequency ablation (RFA) or liver transplantation are amongst major treatment options. Regular follow-up after therapeutic management should be done.[4]

## Case

A 78-year-old male patient with hepatitis B and liver cirrhosis was diagnosed with suspicious focal lesion in left lobe of liver in USG.

Multiphase CT abdomen was done at our hospital for further characterization of the lesion [Fig 1]. A focal hypodense lesion was detected in superficial sub-capsular parenchyma of left lobe of liver [Fig. 1A]. The lesion was showing mild arterial enhancement [Fig. 1B] and washout in postal venous [Fig. 1C] and delayed phase [Fig. 1D] (hypodense compassed to adjacent parenchyma). Other background features of cirrhosis and portal hypertension were detected including splenomegaly, dilated portal venous system and multiple collaterals in perisplenic and splenic hilar region. Imaging diagnosis of well differentiated HCC was made. Patient underwent ultrasound guided true-cut biopsy, which proved the imaging diagnosis of well-differentiated HCC.

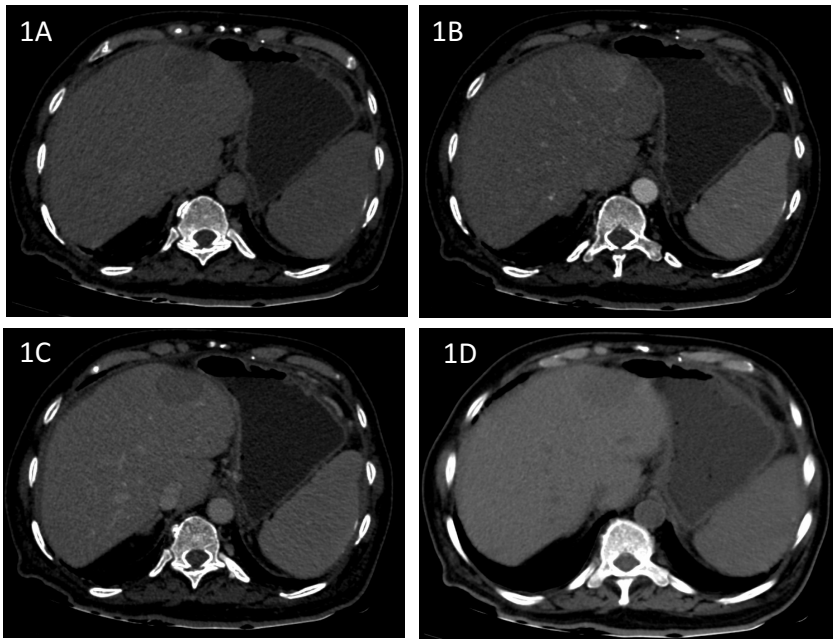


Figure 1 : Incidental detection of HCC in hepatitis B positive patient with chronic liver disease. Non-contrast image (1A) shows hypodense focal lesion superficial subcapsular parenchyma of left lobe of liver. Post contrast images show mild homogenous enhancement in arterial phase (1B) with washout in portal venous (1C) and delayed (1D) images.

Based on clinical and imaging features of lesion, RFA of the lesion was decided and CT guided RFA was done.

Post RFA follow-up multiphase CT was done in our hospital at one month interval [Fig. 2]. On follow-up CT, a well-defined, non-enhancing hypodense focal area with subtle hypodense areas within was seen at site of lesion consistent with post-ablation zone with internal coagulative necrosis and haemorrhage [Fig. 2A]. Subtle peripheral smooth thin rim enhancement was seen in portal venous and delayed images due to mild persistent post-ablation perilesional hyperaemia and inflammation [Fig. 2C and 2D]. No evidence of any arterial enhancing nodular residual lesion was seen [Fig. 2B]. Further follow up imaging with multiphasic CT scan at 6 and 12 months was advised.

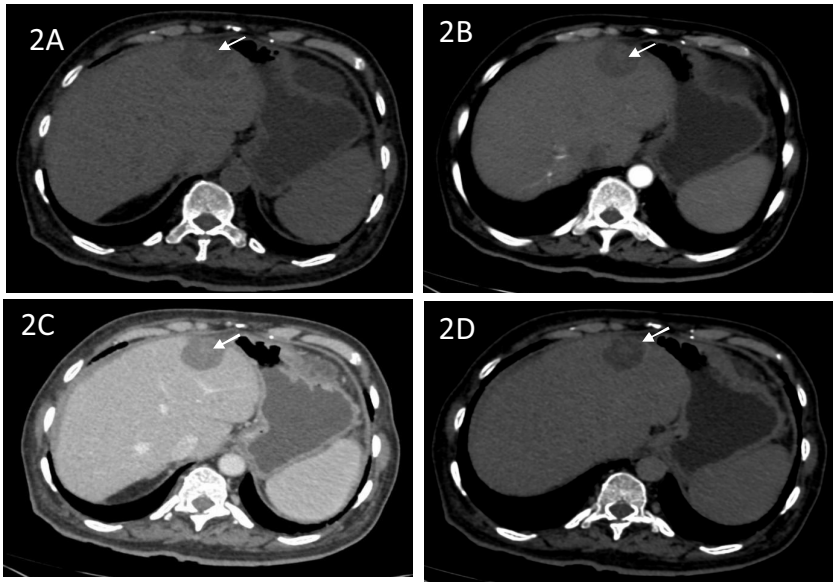


Figure 2: Follow up multiphase CT scan, one month after RFA of HCC. Non contrast image (2A) shows hypodense area at the site of HCC with subtle hyperdensity within corresponding to post ablation zone with coagulative necrosis and minimal haemorrhage. Post contrast images show absence of any enhancing residual soft tissue component in arterial (2B), portal venous (2C) or delayed (2D) images. Minimal peripheral rim enhancement in portal venous (2C) and delayed (2D) images is due to persistent perilesional hyperaemia and inflammation.

## Discussion

Patients with cirrhosis of liver are at higher risk for developing HCC.[2,3] Periodic evaluation by ultrasound is essential to detect any focal lesion in cirrhotic liver. However, further characterization of liver lesion is best done by multiphase CT or MRI study.

Multiple authors have described various CT features of focal lesions in cirrhotic patient.[1-3] Arterial phase enhancement of the lesion with washout in portal venous or delayed phase suggests possibility of HCC.[1] In such cases, histopathological confirmation of the imaging diagnosis by biopsy is advised.

In such incidentally detected, well-differentiated, localized HCC, various treatment options are available. RFA is one of the most effective minimally invasive method for therapeutic management of such HCC.[5] RFA has already been proven as a treatment option for HCC by many authors.[5,6]

Although, there is no widely accepted post RFA imaging surveillance protocol to date, post-ablation surveillance protocol at our hospital includes follow-up multiphase CT or MRI at 1, 3, 6 and 12 months interval. Normal post RFA appearance is hypodense ablation zone with internal variable hyperdense areas corresponding to coagulative necrosis and haemorrhage.[4] Minimal peripheral thin regular rim enhancement can be seen due to persistent post ablation perilesional hyperaemia and inflammation.[4] Solid enhancing soft tissue nodular component in arterial or portal venous phase suggests residual lesion. Irregular peripheral nodular rim enhancement also favours residual lesion in the peripheral part.[7]

Some other normal post RFA appearance are transient air in portal venous and biliary radicles (for 20 minutes to few hours), transient gall bladder wall oedema, haemobilia in form of hyperdense contents in gall bladder and mild perihepatic fluid. Vascular changes in form of wedge shaped parenchymal hyperenhancement can be seen. Soft tissue changes along electrode tract can be seen as fat stranding, self-resolving haematoma or inflammation along tract in form of enhancement.[4]

Abnormal post ablation findings include residual lesion, recurrent lesion or tumour seeding along electrode tract. Various vascular or biliary or non-target injuries post ablation have been described in literature.[7]

We can conclude by saying that multiphase CT/MRI is the ideal imaging modality for detection of HCC in cirrhotic liver. RFA is very promising, minimally invasive, safe and effective treatment modality. Post RFA routine imaging surveillance is essential to detect normal and abnormal findings.

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# Temporary Covered Stents For Treatment Of Anastomotic Leaks Following Gastric Bypass Surgery

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**Dr Koshish Nandan Pokharel** (MS)

Case Report

## Abstract

A 47-year-old male patient having gastrojejunostomy-associated anastomotic leak after gastric bypass surgery was treated using temporary covered stents. This not only avoided oesophageal injury from metallic stents but also avoided the need for open or laparoscopic surgical re-exploration, which can contribute to the morbidity of this life-threatening complication.

## Introduction

Roux-en-Y gastric bypass (RYGB) is one of the most effective bariatric surgical procedure for weight loss.[1] While improvements in surgical technique have significantly reduced postoperative complication rates, anastomotic leak continues to occur and remains an important cause of postoperative morbidity and mortality.[2] Repair of an anastomotic leak may involve open or laparoscopic surgical re-exploration, which can contribute to the morbidity of this life-threatening complication.[3] A transoral endoscopic approach, using a covered stent, has the potential to avoid further morbidity from a potentially difficult intra-abdominal attempt at repairing the hole. Covered stents have been used for oesophageal anastomotic leaks following non-bariatric procedures with good success. Several reports have described the effective use of this therapy for such leaks, as well as for malignant oesophageal fistulas.[4,5]

Recently, this technique has been applied to the treatment of gastrojejunal anastomotic leaks after gastric bypass surgery and the results have been encouraging.[6] We describe the successful use of a removable covered plastic stent for gastrojejunostomy-associated anastomotic leak following Roux-en-Y gastric bypass.

## Case

A 47-year-old male with a body mass index of 44.7 kg/m$^2$ and a medical history of type 2 diabetes (taking insulin), hypertension, obstructive sleep apnoea, and active fungal skin infection on both hands, and habit of chewing tobacco underwent an elective laparoscopic anticolic, antigastric RYGB with single layer hand sewn GJ anastomosis at our hospital. Intra-operative air leak test showed no anastomotic leak. The early postoperative period was uncomplicated and the patient was discharged after prescribing bariatric liquid diet on the 3$^{rd}$ day after the procedure.

On the 6$^{th}$ postoperative day, the patient developed abdominal pain in the left lumbar and pelvic region and bad smelling burps, diaphoresis, tachycardia (heart rate 86 beats per minute, blood pressure 134/70 mm Hg) with normal bowel and bladder habit. There was no history of left shoulder pain and patient was able to take liquid properly. He was managed with oral Refaximine 550 mg given three times daily for 14 days and iv Ceftriaxone 2 gm given twice daily for 5 days but he did not get relief from bad smelling burps, so computed tomography (CT) of abdomen with oral contrast was done on 20$^{th}$ post-operative day which demonstrated a large rim-enhancing defect and fluid collection near the GJ anastomosis with dye passing the remnant stomach [Fig. 1] and a small amount of free intraabdominal fluid. CT guided malecot drain (no. 28) was inserted to drain the fluid. On the 21$^{st}$ post-operative day on-table flexible gastroscopy was performed and a large leak area near the oesophagous-pouch junction [Fig. 2] and intact GJ anastomosis with an abscess cavity behind it were identified . During endoscopy a Niti-S Esophageal covered mega-stent (DongBang AcuPrime, TaeWong Medical Co. Ltd., Gyeonggi-do, Korea) was placed spanning from mid oesophagus to 5 cm beyond leak area to cover the leak area [Fig. 3]. Nasojejunal (NJ) tube was inserted for feeding.

On the 2$^{nd}$ day following placement of the stent, increased drain output was noted. A CT scan revealed contrast extravasation and migration of the initial stent. Re-endoscopy was done and stent was fixed by passing nylon thread through flange of stent and thread out through nose and fixing it to the nose. Patient was stable and no contrast extravasation was seen in repeat CT abdomen [Fig. 4]. Postoperatively, the patient was stable and slowly improving. Enteral feeding through the NJ was continued during the entire duration of hospitalization. After the discharge, on the 25$^{th}$ postoperative day, there was decrease in output from the intraperitoneal drain. After 15 days of stent placement, patient was tolerating a bariatric diet with minimal drain output and the surgical drain was removed. Subsequently, the stent was removed endoscopically after a month. No leak or hole was visible in endoscopy after removing the stent. Repeat CT after removal of stent was also normal with minimal contrast in remnant stomach. Soft diet was started for the patient.


Figure 1: Large rim-enhancing defect and fluid collection near the gastrojejunal anastomosis

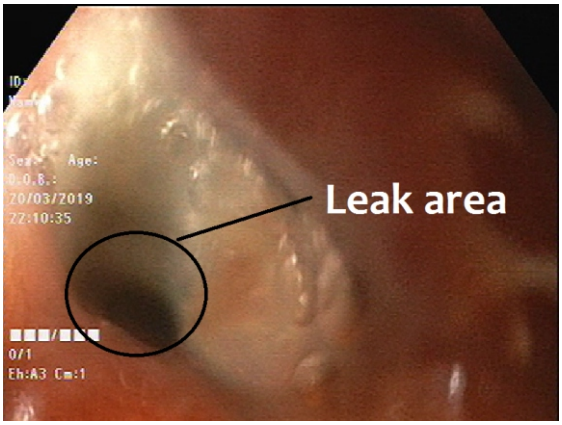


Figure 2: Leak as evident in Endoscopy

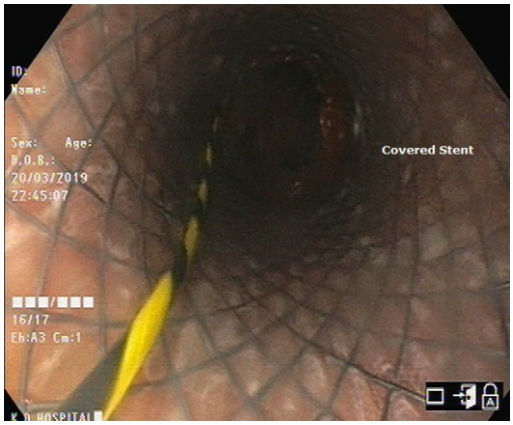


Fig 3: After placement of covered stent

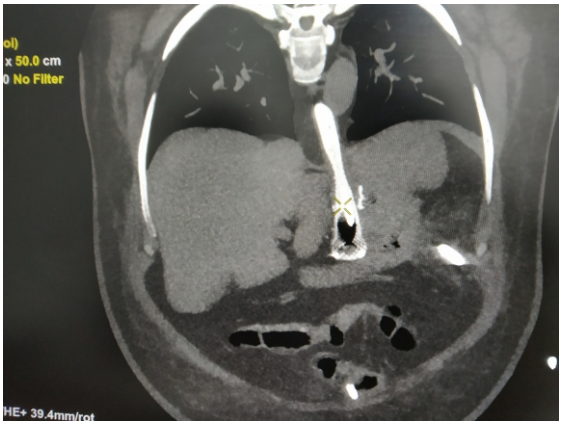


Fig 4: Large covered stent

## Discussion

A gastrointestinal leak is one of the leading causes of mortality after gastric bypass. Possible risk factors for a leak include advanced age, male predisposition, increased basal metabolic index (BMI), type II diabetes mellitus, continuous positive airway pressure (CPAP) therapy for obstructive sleep apnoea, chronic steroid intake and revision surgery. A leak after gastric bypass may occur at the gastrojejunostomy, the gastric pouch staple line, the distal stomach line, or the jejunojejunostomy. The majority of leaks occur at the gastrojejunostomy anastomosis.[7] Small, contained leaks can be treated with percutaneous drainage. The main objective of re-exploration is to identify the location of the leak and provide drainage. Repairing the breakdown by simple sutured closure may not be possible if the tissue is inflamed and friable.

Patients who have a gastrojejunostomy or a gastric pouch leak that is small or contained may also be candidates for transoral endoscopic therapy. This non-operative approach to gastrointestinal leak treatment is evolving rapidly with the use of temporary plastic-coated stents, fibrin glue, endoscopic clips, and endoscopic suturing.[8]

Stents are currently being used for both oesophageal and colonic strictures. They have been used in treatment of malignant tracheoesophageal fistulas, and more recently in the treatment of oesophageal perforations and anastomotic leaks.[4,5] There have been recent reports of stents used in patients with anastomotic leaks at the gastrojejunostomy after gastric bypass. These studies reported successful placement of covered stents (Polyflex, Boston Scientific, Natick, Massachusetts) and metallic stents to treat this condition. The patients were able to tolerate oral feeding within 2 to 3 days after stent placement.[6,9]

Merrifield *et al* described stent placement as well as other endoscopic methods to assist in closure of anastomotic leaks. They used Triclip (Cook Endoscopy, Winston-Cook, Winston-Salem, North Carolina) with argon plasma coagulation to promote closure. Resolution clips (Microinvasive Endoscopy, Boston Scientific, Natick, Massachusetts), Quick Clips (Olympus America Inc., Melville, New York) and the Bard EndoCinch device (CR Bard Inc, Murray Hill, New Jersey) have also been described as treatment options.[10-12] Human fibrin tissue sealant has been used alone or in combination with endoscopic clips for the endoscopic management of gastrocutaneous fistula after bariatric surgery. In these cases, multiple procedures may be needed with varying volumes of glue to control the leak. The fibrin glue applications were found to initially reduce the drainage output from abdominal drains. The mechanism of action was shown to be occlusion of the inner orifice, the main drainage tract and septic cavity, if present.[13]

The majority of patients previously reported with gastrojejunostomy leaks managed with stent placement exhibited containment of the leak and were able to tolerate oral nutrition. These patients underwent removal of the stents after resolution of the leaks. Removal appears to be much easier with plastic stents than with metallic stents, as the latter have been associated with oesophageal mucosal tears. However, plastic stents appear to suffer from the drawback of being prone to distal migration. Migrated stents can be managed with endoscopic removal, or can be allowed to pass through the gastrointestinal tract.[6,9] In the present case, patient experienced stent migration, necessitating removal and replacement of the stent. Overlapping stents or fixation with clips may help to lessen the risk of migration.

In summary, transoral endoscopic stent placement is a viable option for treatment of anastomotic leaks after gastric bypass. Covered plastic stents are preferred because of the risk for partial- or full-thickness oesophageal injury during removal of metallic stents. However, these removable stents are prone to migration and require careful follow-up. Finally, transoral endoscopic treatment for gastrointestinal leak should be considered only in stable patients with small and/or contained leaks that are adequately drained.

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# Flaccid Paralysis With Peripheral & Central Involvement: Could It Be Sjogren's Syndrome?

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Case Report


## Abstract

A 30 year old female who had undergone multiple treatments for periodic hypokalemia and flaccid paralysis presented to our hospital with diagnosis of encephalopathy in MRI. During work-up renal tubular acidosis (RTA) and viral encephalitis were confirmed. As CNS and peripheral involvement was there with flaccid paralysis, differential diagnosis was searched and autoimmune profile was investigated leading to diagnosis of Sjogren's Syndrome that was treated with steroid and cyclophosphamide. The patient's condition improved and there was no recurrence on follow-ups.


## Introduction

Primary Sjogren's syndrome (pSS) is a chronic systemic autoimmune inflammatory disease with lymphocytic infiltration in the exocrine glands (mainly the salivary and lacrimal glands) in middle-aged women predominantly. Extra-glandular tissues such as liver, kidney, pancreas, lung, skin, and central nervous system (CNS) may also be involved.[1-4]

Renal changes were considered to represent one of several extraglandular (systemic) changes occurring in Sjögren's syndrome and renal tubular acidosis (RTA) is considered to be a probable inherent result of the disease process responsible for the development of Sjögren's syndrome.[5] This is known to cause hypokalemia[6] with periodic paralysis. Periodic paralysis is a rare neuromuscular disorder, related to a defect in muscle ion channels, characterized by episodes of painless muscle weakness. The most popular and primary cause of hypokalemic periodic paralysis (HPP) is familial. The identified secondary causes include distal RTA due to Sjogren's syndrome, drug induced proximal RTA (Fanconi's syndrome), & thyrotoxicosis.[7] However, liver and CNS involvement is comparatively rare.

## Case

A 30 year old female patient having complains of breathlessness and drowsiness since 2 days was intubated and kept on mechanical ventilation elsewhere. The patient was referred to our hospital for further management with a diagnosis of encephalopathy on MRI. A history of electrolyte imbalance, road traffic accident 15 years back, and HPP two years ago with repeated episodes since a year was given by the patient.

CVS examination revealed no abnormal murmur and the respiratory system was bilateral air entry (BLAE) positive with presence of crepitations. On CNS examination, patient was disoriented, drowsy, stuperous, exhibited left-sided weakness, and had a Glasgow Coma score of E1M3VT.

Patient was admitted in the ICU and mechanical ventilation was continued. Injection of 500 mg corticosteroid was administered intravenously once daily for 3 days and simultaneous references for neurological and nephrological assessments were made.

| TEST | RESULTS | UNIT | EXPECTED VALUES | REMARKS |
|---|---|---|---|---|
| **Anti Nuclear Antibody by BlueDiver Quantirx(Quantitative IgG)** | | | | |
| Nucleosome Ab | <6 | AU/ML | 0 - 6 | |
| Histones Ab | <6 | AU/ML | 0 - 6 | |
| Sm Ab | <6 | AU/ML | 0 - 6 | |
| Ribosomes P0 Ab | <6 | AU/ML | 0 - 6 | |
| PCNA Ab | <6 | AU/ML | 0 - 6 | |
| Cenp-A/B Ab | <6 | AU/ML | 0 - 6 | |
| RNP 68kd/A/C Ab | <6 | AU/ML | 0 - 6 | |
| Sm/RNP Ab | <6 | AU/ML | 0 - 6 | |
| Ssa/Ro 60kd Ab | HH 86 | AU/ML | 0 - 6 | |
| Ssa/Ro 52kd Ab | HH 100 | AU/ML | 0 - 6 | |
| Ssb Ab | <6 | AU/ML | 0 - 6 | |
| Scl-70 Ab | <6 | AU/ML | 0 - 6 | |
| Jo-1 Ab | <6 | AU/ML | 0 - 6 | |
| PL-7 Ab | <6 | AU/ML | 0 - 6 | |
| PL-12 Ab | <6 | AU/ML | 0 - 6 | |
| Srp-54 Ab | <6 | AU/ML | 0 - 6 | |
| Ku Ab | <6 | AU/ML | 0 - 6 | |
| Pm-Scl 100 Ab | <6 | AU/ML | 0 - 6 | |
| Mi-2 Ab | <6 | AU/ML | 0 - 6 | |
| Sp100 Ab | <6 | AU/ML | 0 - 6 | |
| Gp210 Ab | <6 | AU/ML | 0 - 6 | |
| M2 Recombinant Ab | <6 | AU/ML | 0 - 6 | |
| M2 Native | <6 | AU/ML | 0 - 6 | |
| F-Actin Ab | <6 | AU/ML | 0 - 6 | |
| IgG Ab To DsDNA *CLIA* | 4.22 | | < 20 IU/ml : Negative<br>20-25 IU/ml: Equivocal<br>>25 IU/ml : Positive | |

Reports suggested that serum ammonia level were elevated so it was treated concurrently. Anti nuclear antibody (ANA) tests were done and the dose of intravenous corticosteroids was increased to 1gm for 2 more days and then to oral corticosteroid (40 mg) once daily. The neurological condition improved over time and the patient was extubated. Meanwhile the ANA reports indicated the presence of Ssa/Ro 60kd antibody indicating Sjogren's syndrome[8] [Fig.1].

Figure 1: Patient's ANA report indicating the increased titres of Ssa antibodies

The patient had no neurological abnormality but could not communicate much or take anything orally after the removal of the Ryle's tube. Consequently, psychiatric counselling was done and antidepressant medication was started.

At the time of discharge, on the 20th day, the urine output of the patient was high and needed frequent electrolyte monitoring. The Ryle's tube and catheter were kept *in situ* and physiotherapy was advised for mobilization. The patient was advised Ryle's tube feeding and strict lateral position with regular serum electrolyte testing and follow-up.

During follow-up, after 15 days Ryle's tube and catheter were removed. Patient was able to take food orally. Five cycles of cyclophosphamide 500 mg in 250 ml of normal saline were advised every 15 days. The patient became completely asymptomatic after the second cycle. Oral steroid 40 mg was given once daily for another 6 months and patient was asked to come for regular follow-ups.

The oral steroids were continued and the dose was tapered in regular follow-ups.

## Discussion

Apart from exocrine glands, pSS has been known to commonly affect the renal function and relatively less commonly the CNS and liver.[9-11]

In the present case also, the patient came with an initial diagnosis of encephalitis with encephalopathy due to sepsis and metabolic derangement because of increased ammonia, kidney involvement and CNS encephalopathy in MRI. In fact, neurological symptoms may be the first signs of pSS in 57% of the cases.[11]

While the association of Sjogren's syndrome and RTA has been suspected and discussed since 1968 and several cases have reported the association, Sjogren's Syndrome goes unrecognized for several years as discussed in several case reports. Similarly, paralytic episodes due to hypokalemia secondary to RTA associated with Sjögren's syndrome is also presented in these cases.[1,2,12-19] However, brain involvement with Sjogren's complicated the diagnosis in this case but could be confirmed through the ANA test reports.[8]

In an Indian case study by V.K. Jain, sixty patients of pSS were followed and 15 of them presented with HPP as the initial manifestation, onset at younger age, distal RTA, and high titres of anti-SSA antibody.[3]

Most of the cases of Sjogren's syndrome with associated initial manifestation of HPP and distal RTA were seen in females in the age-group 21 - 62 years.[6,12, 13, 15,16,18,20] Thus, HPP serves as clinical marker for patients with primary Sjogren's syndrome and RTA.[19]

Etiology of RTA is multifactorial but RTA is a frequent extraglandular manifestation of Sjögren's syndrome and renal excretion of monoclonal proteins and the immunologically-induced interstitial inflammation are the main possible factors of this renal tubular defect.[21]

Sjogren's syndrome involving the central nervous system lesions is uncommon, and its diagnosis is more difficult. Only after considering the clinical symptoms, pathological examination, neuroimaging and laboratory tests, can we accurately diagnose and ensure the treatment.[4] Another study of 424 pSS patients revealed CNS involvement in 25 cases out of which 24 were females.[9] However, these cases also exhibited CNS manifestations

Though the extraglandular manifestations of Sjogren's syndrome may include the kidneys, joints, blood vessels, and lungs, brain involvement in the form of encephalopathy is rare.[1,2] This was the cause for delayed diagnosis in the case, though it was managed effectively after diagnosis.

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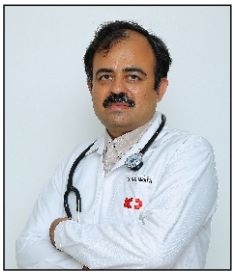

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# Successful Complex Knee Replacement Surgery In Patient With Osteoarthritis And Old Non-union Fracture Tibia

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Case Report

## Abstract
It is challenging to treat stress fracture of the tibia associated with osteoporosis and osteoarthritis of the knee. A 61-year old female was successfully treated for severe osteoarthritis and non-union upper end tibial fracture in right leg using total knee replacement (TKR) surgery with extension rod and medical management of osteoporosis at our hospital. The left TKR was also done using the extension rod prophylactically. This was followed by a conservative approach and the fracture healed completely within three months and the patient was able to walk independently.

## Introduction
Osteoarthritis (OA) of the knees is a common chronic disease in the elderly. Primary OA has been associated with enhanced age, body mass index (BMI), and osteoporosis and is known to cause pain and disability[1-7]. OA of knees is associated with coronal deformities like varus or valgus that lead to asymmetrical loading and abnormal repeated stress concentration in the metaphyseal area of proximal tibia leading to insufficiency and stress fractures.[8-10] This is compounded by underlying osteoporotic bone in these elderly patient group leading to stress fractures in the upper end of tibia.

Stress fractures occur due to repeated micro trauma on the bone over a prolonged time period. In the elderly, the condition is commonly associated with osteoporosis.[8] Stress fractures of the tibia have been reported to be common in women with osteoarthritis of the knee with varus deformity.[11]

Proximal tibia stress fractures with knee osteoarthritis pose a challenging situation. Treatment options for these dual problem of stress fracture along with osteoarthritis include treating the stress fracture alone or to combine with osteoarthritis treatment. Total knee replacement (TKR) with long stem (extension rod) addresses both the problems by arthritis correction, restoring limb alignment, and stabilizing the fracture site which aids in union and helps in faster recovery in these elderly patient group.[8]

## Case
A 61-year old female presented with severe pain in both knees and right upper leg pain with associated lower back pain. Patient was non-diabetic, hypertensive (on medication), and not able to walk since 1.5 years. There was history of right leg femur fracture that had been operated 10 years back with nail *in situ* [Fig. 1].

All investigations - localised x-ray, full-length x-ray, CT scan, and blood investigations including tests for parathyroid hormone (PTH) were advised. X-rays revealed severe bilateral knee osteoarthritis and upper-end tibial untreated non-union fracture with osteoporosis and severe varus deformity in right leg evident in the full length x-rays [Fig. 1]. The PTH values were normal.

She was admitted for both side knee replacement surgery and surgical management of upper end tibia fracture with extension rod and bone grafting. On admission patient was stable with heart rate of 74/minute, blood pressure of 110/74 mm Hg.

Right knee arthrotomy was done and right knee replacement was planned under spinal/regional anaesthesia. As there was femur nail *in situ*, image intensive television (IITV) guided distal femur resection was done. The tibia was exposed along with upper end fracture. Reduction of the fracture was done followed by sequential reaming of tibia and resection of proximal tibia. After trials, routine femoral implant was inserted. Tibial base plate was placed with extension rod which was scratch fit. Bone grafting was done at the fracture site [Fig. 2,3,4].

After this left side TKR was also done with tibial extension rod as a preventive measure to prevent tibial fracture in future [Fig. 3,4]. Patient was mobilized and kept non-weight bearing on right side for 8 weeks. Anti-osteoporotic regimen was given in the form of injection Teriparatide 0.6 mg subcutaneously daily for 6 months with calcium and vitamin D3.

The patient was discharged in a haemodynamically stable condition and allowed to walk with walker after 2 months of discharge with concomitant rehabilitation process. At present (after 3 months) the fracture has united completely and the patient is able to walk independently.

Figure 1: Pre-operative right leg x-ray showing severe osteoarthritis knee with upper-end tibial fracture and femur fracture with nail *in situ*

Figure 2: Immediate post-operative x-ray of right knee after replacement with tibial extension rod and bone grafting

Figure 3,4: Both knee x-rays on 3-month follow-up after TKR and upper end tibial fracture union

## Discussion

Joint replacement surgery can alleviate pain and restore function but is associated with risks and discomfort. A prospective cohort study that examined clinical outcomes in elderly patients above 65 years with severe osteoarthritis of hip or knee that was inadequately controlled with conservative treatments showed that elderly patients who had hip or knee replacements for severe OA took several weeks to recover but experienced excellent long-term outcomes.[12]

Malalignment secondary to osteoarthritis increases the stress at the fracture site, which predisposes to delayed or non-union.[13] Management of these stress fractures is challenging and is either conservative or surgical. For stress fracture associated with nonunion and deformity, long tibial stem alone may not be sufficient. Augmentation with plate and bone grafting allows rotational stability.[14] Scratch fit tibial rod augmented with bone graft were used for stabilization in the present case.

A study in which 20 patients, 3 men and 17 women, having a mean age of 64, with proximal tibia stress fractures associated with knee osteoarthritis of varied grades treated with posterior stabilised TKR with long stem, were followed for a mean period of 28 months showed improvements in the tibiofemoral angle, mean knee society score, the mean knee society functional score, and led to complete fracture union, thus indicating excellent outcomes.[8]

Proximal tibial stress fracture associated with osteoarthritis and varus deformity adds the complexity of the situation. Mild to moderate osteoarthritis also may present with stress fracture and one should not hesitate to treat it with TKR. Moreover, time delay in diagnosing the stress fracture due to lack of suspicion, ignoring pain over the proximal tibia, not ordering full length radiographs, may lead to progression of non-union at the level of stress fracture and affect the healing pattern associated with coexisting osteoarthritis.[15] So, it is very important to discuss joint replacement surgery with elderly patients who might benefit and make prompt

clinical diagnosis based on full length x-rays and blood reports to avoid delays in providing the needed treatment.

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# Influenza Associated Encephalopathy/ Encephalitis In Adults: Imaging Findings On MRI

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Case Report

## Abstract

In adults, Influenza associated encephalopathy/encephalitis (IAE) is a serious though rare complication of Influenza A infection. It may have specific clinical and radiological presentation and should be suspected when any patient with H1N1 infection does not recover and/or worsens neurologically even after resolution of respiratory symptoms. Investigations must include CSF study and MRI including diffusion weighted imaging.

## Introduction

Neurological complications reported in Influenza A (H1N1) virus infection are encephalopathy/encephalitis, seizures, and Guillain Barre syndrome.[1] The only population based study on the epidemiology of Influenza associated encephalopathy/encephalitis (IAE) estimated an incidence of 1.2/100000 symptomatic H1N1 illnesses in 2009 observed mostly in paediatric age group.[2] A recent case report identified 44 reports of adults with documented IAE by Medline search.[3] However, clinical and radiological characteristics of IAE in adults are not well documented.

## Case

A 47-year-old lady presented with cough, fever, and dyspnoea followed by respiratory failure for which she required intubation and ventilation. Her nasopharyngeal swab was positive for H1N1 infection by polymerase chain reaction (PCR). She remained stuporous even after sedation was stopped. Her neurological examination showed absence of oculocephalic reflex with weakness of all four limbs and pain on extension of limbs suggestive of brainstem involvement with positive Babinski sign bilaterally. She was provisionally diagnosed to have IAE for which an MRI brain was done that showed faint hyperintensities on FLAIR involving the thalami bilaterally [Fig.1] with diffusion restriction [Fig.2]. She succumbed to the illness during the treatment in the hospital.

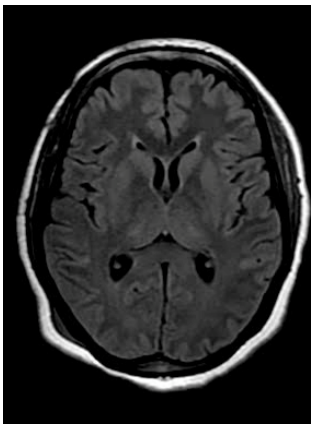

Figure 1: FLAIR image of MRI brain shows bilateral near symmetrical hyperintensities in thalami corresponding to morphological changes of viral encephalitis

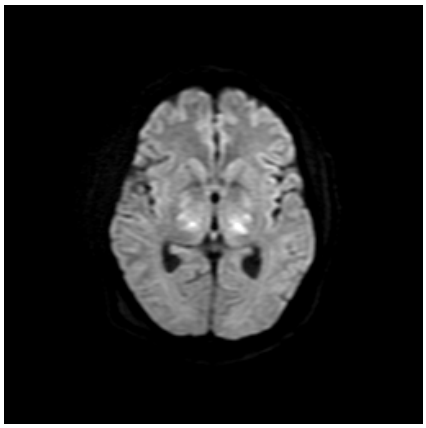

Figure 2: DWI image of MRI brain shows bilateral near symmetrical hyperintensities in thalami corresponding to morphological changes of viral encephalitis

## Discussion

IAE has variable course ranging from no residual sequelae to severe residual signs and symptoms. Most common clinical symptoms include confusion and seizures.[3] Based on the onset of influenza infection in relation to onset of neurological symptoms, IAE can be classified as acute, subacute, or late. In the present case, the neurological symptoms were observed around 10 days following the onset of respiratory symptoms. Scarce data is available on recovery from IAE report a full recovery in around 61% cases.[1] MRI in IAE cases in adults has shown involvement of cerebellum, brainstem, splenium of corpus callosum and thalami.[3]

In the present case, patient had bilateral thalamic lesions.These paired lesions have a limited differential diagnosis that includes viral infection like IAE, metabolic and toxic disorders, hypoxic-ischaemic injury, and neoplasia.[4] The differential diagnosis can be further narrowed with the patient history, imaging characteristics, and presence or absence of lesions outside the thalami.

Another such case of an adult patient has been reported having IAE developing progressive and severe encephalopathy after resolution of respiratory symptoms in whom the MRI showed posterior multifocal leucoencephalopathy with pulvinar sign. Delayed clinical and radiological involvement in this case suggests the possibility of post infectious process.[5]

One limitation of this report is the absence of CSF examination which could not be obtained due to worsening general condition of the patient. However, laboratory evidence of influenza virus outside the CNS in combination with MRI suggestive of IAE can establish the diagnosis of IAE.[3]

In summary, IAE in adults is serious but rare complication of influenza infection and not well documented but may have specific clinical and radiological presentation. It should be suspected in any patient when patient with H1N1 infection does not recover neurologically even after resolution of respiratory symptoms and should be investigated with MRI and CSF study. MRI should include DWI sequence and particularly thalami, pulvinar, brainstem, cerebellum and splenium of corpus callosum should be looked for abnormalities.

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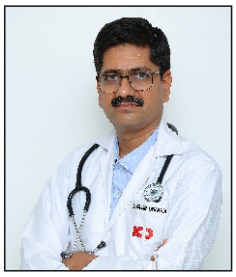


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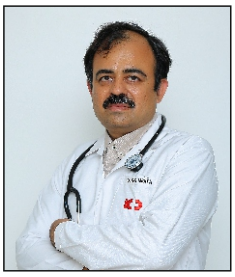


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# Unusual MRI Presentation Of Chronic Bursitis / Synovitis In Form Of Rice Bodies

**Dr Masum Shah** (MD)
**Dr Ronak Patel** (MD, DNB, FRCR)
**Dr Yash Patel** (MD)

Case Report

## Abstract

A male patient having complaint of gross swelling over shoulder region was advised MRI study and rice bodies were demonstrated within markedly distended subacromial-subdeltoid bursa. Here we highlight the implications of this finding and the differential diagnosis.

## Introduction

Chronic synovitis, be it infective (like Koch's) or non-infective inflammatory (like rheumatoid arthritis), is usually a clinically suspected diagnosis and ultimately confirmed with synovial fluid analysis but magnetic resonance imaging (MRI) is a bridging diagnostic modality in current era for early diagnosis of morphological changes of chronic synovitis or excluding it and guiding whether further invasive analysis of synovial fluid is needed or not.

Rice bodies are multiple small loose bodies that resemble polished grains of rice. These are demonstrable on MRI only and not by other imaging modalities like X-ray/ USG/ CT scan. On MRI, they can be seen in the synovial fluid or bursae in advanced cases of chronic synovial inflammatory/infective conditions which is unusual late presentation in current era of frequent availability and use of MRI for early diagnosis.[1]

## Case

A 57-year-old female patient was referred to radiology department for evaluation of long standing and relatively painless shoulder region swelling.

The MRI revealed grossly distended subacromial–subdeltoid (SA-SD) bursa with presence of numerous tiny hypointensities (resembling rice grains) within bursa on T2-weighted (T2W) and proton density/ proton density fat suppressed (PD/PDFS) images [Fig. 1,2,3] suggestive of chronic bursitis with demonstration of rice bodies.

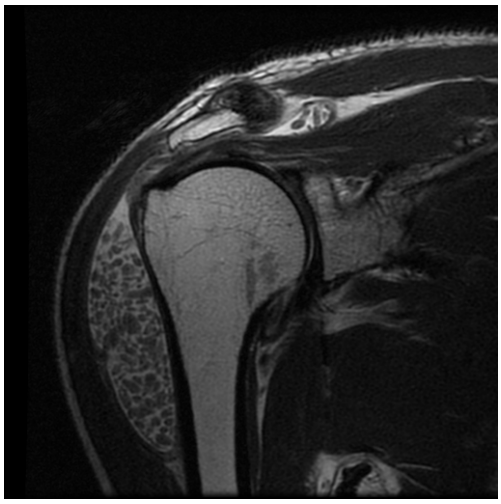

Figure 1: Coronal T2W image of shoulder region showing multiple rice bodies in fluid within SA-SD bursa

Figure 2: Coronal PDFS image of shoulder region showing multiple rice bodies in fluid within SA-SD bursa

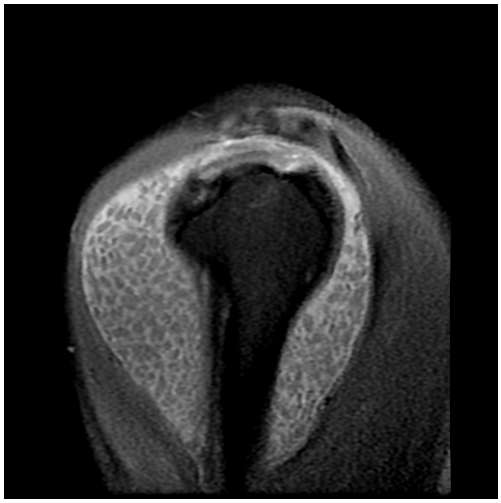

Figure 3: Sagittal PDFS image of shoulder region showing multiple rice bodies in fluid within SA-SD bursa

## Discussion

Rice body formation represents an uncommon, nonspecific, inflammatory process, most commonly associated with rheumatoid arthritis (RA), tuberculosis (TB), juvenile arthritides, seronegative arthritis, osteoarthritis, septic joint, trauma, and chronic bursitis.[2-4]

Rice bodies were initially identified in 1895 in a patient with TB infection and have a gross appearance resembling grains of polished rice. They are presumed to represent the sequelae of microvascular infarcts of the joint synovium, which after sloughing off become encased in layers of fibrin.[2-5] However, their formation has been seen in pleural fluid, within bursae, and in association with the tendon sheath.[2] The exact etiology and prognostic significance of rice body formation are still uncertain as the disease severity and longevity do not seem to be correlated.[2]

MRI is the modality of choice for evaluation of rice body formation in diagnostic imaging.[2] Two reasonably common joint pathologies - pigmented villonodular synovitis (PVNS) and synovial chondromatosis should be included in the differential diagnosis of intra-articular rice bodies on the basis of their appearance on imaging.However, while rice bodies are low to intermediate signal on T1W sequences and low signal on T2W sequences, synovial chondromatosis is hyperintense on T2W imaging and PVNS can be differentiated using gradient echo sequences. Due to the presence of hemosiderin within PVNS lesions, there is susceptibility artifact on gradient echo sequences in patients with PVNS, but not in patients with rice bodies.[2,3]

As stated previously, rice body formation is associated with multiple inflammatory conditions including chronic arthritides, infection, and even trauma. However, a few patients present with them before the development of rheumatoid disease.[2,3]

Similar presentation with fluid collection having foci of internal debris, most consistent with a diagnosis of RA associated SA-SD bursitis with rice body formation has been reported by Michele N Edison *et al*.[6]

Thus, MRI showing presence of rice bodies in synovial joint is a hallmark of chronic synovitis/bursitis which can be due to infective or non-infective inflammatory etiologies. Synovial fluid analysis is needed for further evaluation and etiological diagnosis.

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# Ocular Myasthenia Gravis Cured By Thymectomy

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**Dr Suresh T. Bhagia** (MS, FRCS, DNB)

Case Report

## Abstract

A young male patient having unilateral ptosis and diplopia had consulted many different consultants in the periphery including ophthalmologists and neurologists since one year but could not get the desired relief. So he was referred to our OPD for further management of Ocular Myasthenia Gravis after diagnosis by a neurologist in the periphery. Complete success was achieved within two days by performing Thymectomy in this case.

## Introduction

Myasthenia Gravis (MG) is a chronic, rare, autoimmune neuromuscular disorder that affects the postsynaptic neuromuscular junction (NMJ) and causes weakness in the skeletal muscles.[1] Antibodies are generated against the acetylcholine receptor (AChR) at the NMJ which causes failure of neurotransmission and affects the way muscles respond to signals from nerves, leading to muscle weakness.

The voluntary skeletal muscles fail to respond to the nerve impulses due to improper transmission of the impulse. Weakness associated with MG typically gets worse with more activity and improves with rest. Generalized myasthenia involves the bulbar, limb, and respiratory muscles; ocular myasthenia gravis (OMG) is a subtype of MG where the weakness is clinically isolated to the extraocular muscles, levator, and orbicularis oculi. Ocular presentation of the postsynaptic defect in neuromuscular transmission occurs almost invariably in every case of myasthenia.[1,2] OMG is a distinct entity where the weakness is limited to the levator palpebrae superioris, extraocular muscles, and the orbicularis oculi complex. Since the extraocular muscles are not able to adapt to this variable involvement of extraocular muscles, diplopia is a frequent accompaniment to the more common variable ptosis in patients. Ptosis and diplopia are the initial signs of the disease in over 50% of MG patients.[3] The degree of muscle weakness changes diurnally and severity of symptoms progresses with time.[1,2]

## Case

A 39 year old male with unilateral ptosis and diplopia since one year with all other physical parameters normal. He had been prescribed multiple medications like multivitamins and eyedrops from several general practitioners and ophthalmologists. However, there was no relief in his eye condition.

Six months back, he consulted a senior neurologist, who suggested a computed tomography (CT) scan of the thorax to see the involvement of thymus and suspected MG despite the absence of weakness of limbs. CT Thorax revealed an enlargement of thymus [Fig. 1, 2, 3]. Anti-AChR antibodies were not detected in the reports but the electromyogram (EMG)/ nerve conduction velocity (NCV) was suggestive of evidence of significant decrement in left facial-orbicularis oculi indicating postsynaptic NMJ disorder. Medical treatment was not effective so the patient was reffered to the cardiothoracic surgeon.

As patient had already been on medical treatment which had not proved to be helpful, surgical removal of thymus (thymectomy) was planned.

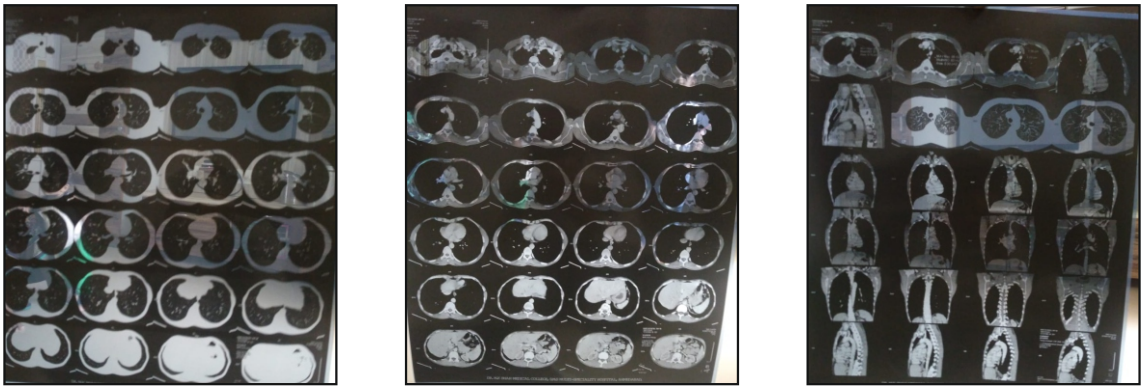

Figure 1, 2, 3 - Pre-operative CT scan images showing enlarged thymus

After patient's consent and willingness, patient was admitted and prepared for surgery. The next day surgery was performed under general anaesthesia by performing midline sternotomy to dissect the thymus and expose it from left phrenic nerve to right phrenic nerve using sharp and blunt dissection. The thymus was removed enmasse and sent for histopathological examination (HPE) and hyperplasia of thymic gland was confirmed.

There was a dramatic subjective and objective improvement in the diplopia and unilateral ptosis after thymectomy. On the second postoperative day itself, the patient and his wife remarked that the patient no longer experienced drooping of the left eyelid, as was the case before surgery.

Patient was discharged after 4 days and came for follow-up after one month and 3 months postoperatively and there was no residual defect in eyes.

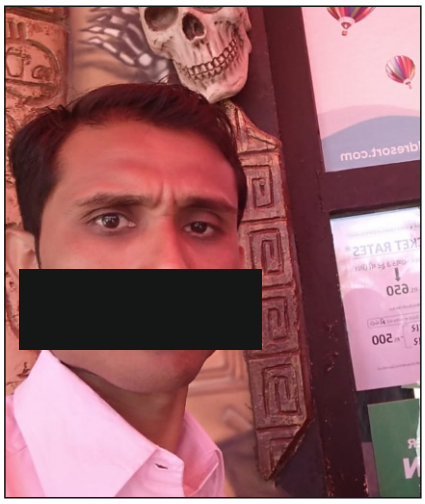

Figure 4: Pre-operative presentation

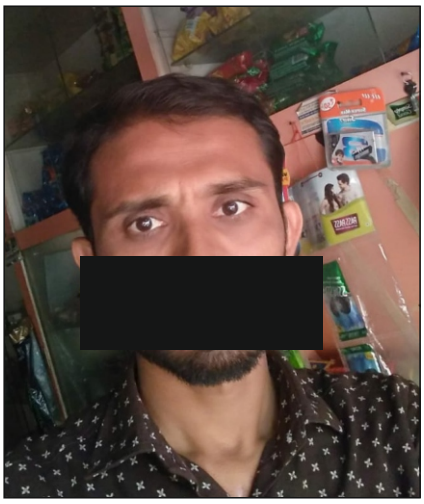

Figure 5: One month post-operative presentation

## Discussion

MG may affect any age group. Onset of symptoms in the first decade or after the age of 70 years is less common [1] and early onset disease (before the age of 40) is associated with thymic hyperplasia.[4] In India, MG is reportedly more common in males than in females.[5] Whilst the ratio of affected females:males is 3:2 or higher in generalized MG, more males are affected by purely OMG.[1]

Strong evidences suggest the involvement of thymus in the pathogenesis of MG and intrathymic mechanisms of tolerance breakdown including abnormal T-cell selection and activation, role of thymic myoid cells, autoimmune regulator (AIRE) and regulatory T-cells have been implicated.[6,7] Thymic hyperplasia is known to be present in 70% of patients with myasthenia and this association indicates lymphoid hyperplasia or thymoma and HPE is needed for further confirmation of the lesion.[1,8-10] The tendency of extraocular muscles to be involved earlier than most other muscle groups stems from higher frequency of synaptic firing in these group of muscles owing to faster development in tension in their twitch fibres leading to earlier fatigue .[2]

Diagnosis of MG may involve detailed neurological testing like Serum AChR antibody levels, tensilon (edrophonium) test, repetitive nerve stimulation test (RNST - showing a decremental response in the test muscle), single-fibre electromyography (SFEMG), and computed tomography (CT) scan of thorax[1,2,11-13]

The goal of treatment of MG is to manage symptoms and control the activity of the immune system.[14] In OMG, the aim is to improve ocular symptoms of diplopia and ptosis, achieve disease remission, minimize drug-induced side effects, and to monitor for slowing or preventing its progression to generalized MG.[1,2]

Transsternal approach with thymectomy is the accepted standard surgical approach for many years.[15,16] While thymectomy is advised in patients who present with thymoma as it is believed to delay the onset of generalized symptoms[2], removal of thymus gland may help to reduce muscle weakness in many patients.[17] While thymectomy has been accepted to be an effective treatment for MG, its role has been demonstrated to be effective and safe in cases with OMG (with/without thymomas) by Roberts *et al* who conducted a review and follow-up study in 61 patients over a mean duration of 9 years. The condition was found to cure or improve in 67-70% of the cases irrespective of the pre-operative symptoms or the patient's age.[18] In fact, a review study, done in 57 patients over a period of 10 years, to study the surgical outcome of thymectomy in MG patients states clearly that while medical treatment has a remission rate of as low as 15%, trans-sternal thymectomy has shown clinical remission rates of as high as 80% and has become the accepted mode of treatment, especially in case with OMG.[19] Another literature clearly states that remission with thymectomy in MG treatment was better than conservative treatment with only medication and recommends thymectomy for patients younger than 60 years.[15]

Isabel Nieto *et al* showed that thymectomy gives the best results for MG if the time between the onset and surgery is about 8 months.[20] In the present case, it was a little over 9 months and so the prognosis was good.

Thus, it is important to suspect MG even if the patient has only ocular symptoms and surgical treatment with thymectomy should not be delayed when conservative treatment is not helping to prevent the progression of the disease.

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# Special 26 Bariatric Cases In A Day: Anaesthesia Concerns, Challenges, And Management

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**Dr Tejaswini Sheth** (DA, DNB)

Original Article

**Abstract**
Anaesthesia induction varies in different types of surgeries and so does it for bariatric surgery also. The treating anaesthesiologist must keep in mind the special challenges and use multi-disciplinary team approach for a smooth and uncomplicated process and recovery.

## Introduction

Obesity is defined as abnormal or excessive fat accumulation that presents a risk to health. From 1998 to 2018, the prevalence of obesity is rapidly spurting due to sedentary lifestyle and consumption of high calorie food.[1]

Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his/her height in meters ($kg/m^2$). The WHO criteria for screening obesity using BMI is:[2]

Underweight : < 18.5
Normal : 18.5 – 22.9
Overweight : 23.0 – 24.9
Obesity I : 25.0 – 29.9
Obesity II : >= 30.0
Obesity III : > 40.0

More than 1.9 billion adults are overweight and 650 million are obese. Approximately 2.8 million deaths are reported as a result of being overweight or obese thus making it a major public health problem in both developing and developed countries.[1] Thus, bariatric surgery becomes a must in such cases to avoid the associated morbidity

## Qualifications for bariatric surgery[3]

1.BMI ≥ 40, or more than 100 pounds overweight.
2 BMI ≥ 35 and at least one or more obesity-related co-morbidities such as type II diabetes mellitus (T2DM), hypertension, sleep apnoea and other respiratory disorders, non-alcoholic fatty liver disease, osteoarthritis, lipid abnormalities, gastrointestinal disorders, or heart disease.
3.Inability to achieve a healthy weight loss sustained for a period with prior weight loss efforts.

## Types of bariatric surgery [Fig. 1]

- **Vertical Sleeve gastrectomy (VSG):** Physically limit the amount of food the stomach can hold, which restricts the quantity of calories.
- **Roux-en-Y Gastric Bypass (RYGB):** Shorten or bypass some portion of the small intestine, which decreases the number of calories and nutrients the body absorbs.

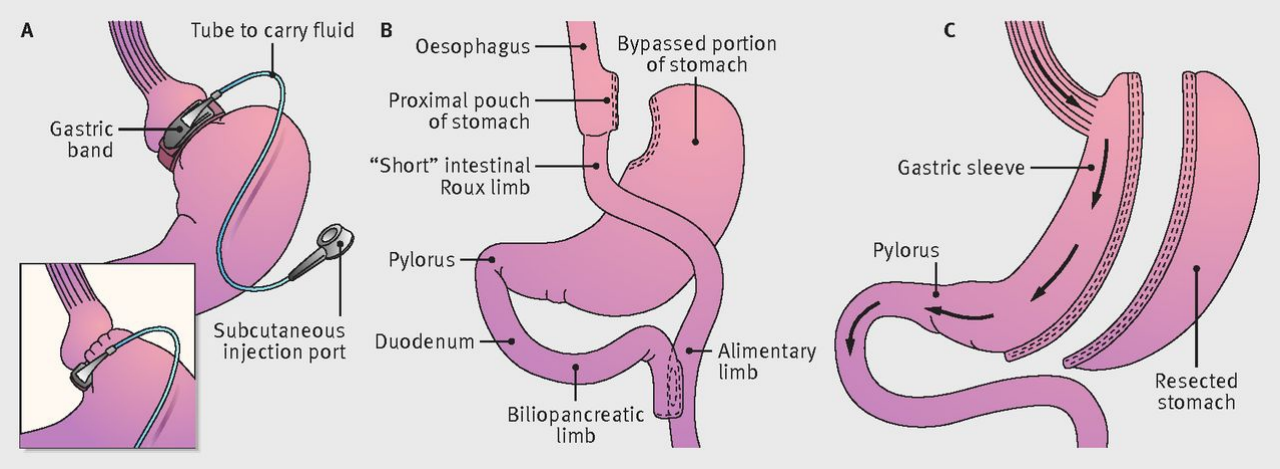



Figure 1: Vertical Sleeve Gastrectomy (VSG) & Roux-en-Y Gastric Bypass (RYGB)[4]

## Obesity-induced pathophysiologic changes [Fig. 2]

Anaesthetists need to keep in account the pathophysiologic changes in the morbidly obese patients as these changes tend to alter the body composition and affect the distribution of numerous anaesthetic drugs. For example, the increased incidence of obstructive sleep apnoea and fat deposition in the pharynx and chest wall places the morbidly obese at increased risk for adverse respiratory events secondary to anaesthetic agents, by altering the pharmacodynamic properties of these drugs.[5]

(a) Metabolism and fat distribution – DM, dyslipidemia, increased basal metabolic rate (BMR) – greater $O_2$ consumption & increased $CO_2$ production leading to early desaturation.

(b) Cardiac diseases – risk of increased blood volumes, hypertension (HTN), ischaemic heart disease (IHD).

(c) Airway & respiratory changes – Obstructive sleep apnoea (OSA), difficult airway, decreased pulmonary and total chest compliance, decreased functional residual capacity (FRC), increased intra pulmonary shunts (V/Q mismatch).

(d) Gastrointestinal (GI) changes – Gastro oesophageal reflux disease (GERD) & hiatus hernia, increased risk of aspiration.

(e) Perioperative thromboembolic events/ stroke/ pulmonary embolism – polycythemia, deep venous stasis, and increased intra-abdominal pressure.

(f) Difficulties in patient transfer and positioning on the OT table – care to protect superficial nerves from external pressures.

(g) Psychological – emotional distress, discrimination, social stigma, anxiety, fear, insecurity.

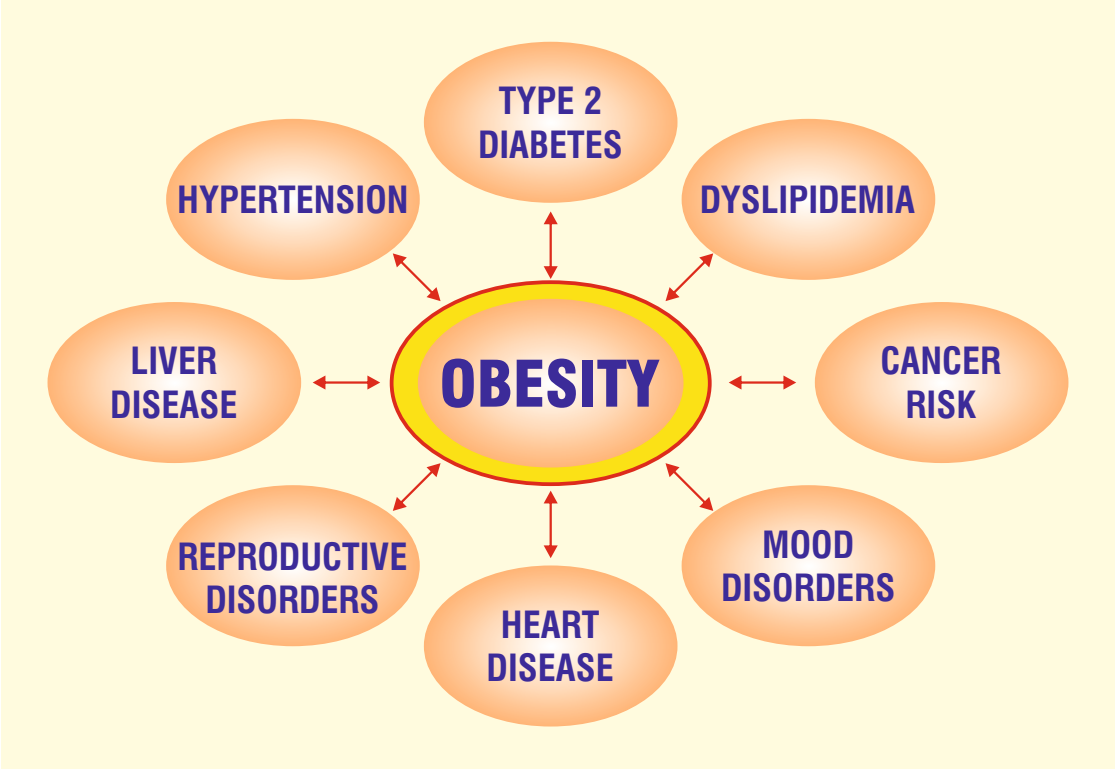



Figure 2: Diseases linked with obesity[6]

## Pharmacological considerations in bariatric patients

Dosing recommendations are generally based on total body weight (TBW). This approach is valid for normal weight subjects whose TBW, lean body weight (LBW), and ideal body weight (IBW) are similar. However, in morbidly obese patients, fat mass and LBW do not increase proportionately leading to increase in TBW and thus overdose of anaesthetic drugs. Alternatively, administrating drugs based on IBW can result in a sub-therapeutic dose. So, there is need to keep in mind the pharmacokinetic and pharmacodynamic differences of morbidly obese individuals while deciding the dosage of anaesthetic drugs.[5,7,8]

The increase in fat mass and cardiac output in obese patients increases the volume of distribution of lipophilic drugs and necessitates the administration of larger initial loading doses which is calculated according to TBW. Whereas lipophobic drugs have unchanged volume of distribution and their doses are calculated based on patient's LBW.[9-12]

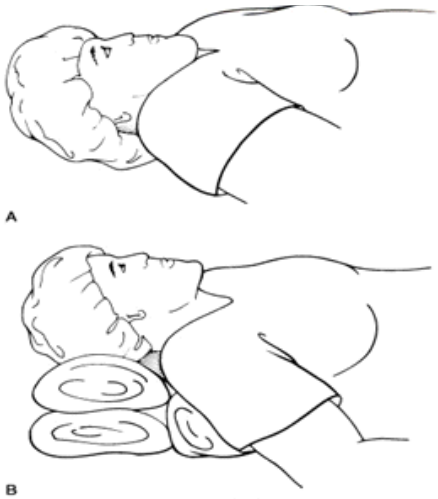
| Drug | Recommended Dosage as Per |
|---|---|
| Thiopentone | TBW |
| Propofol | Induction : LBW, Maintenance : TBW |
| Midazolam | TBW |
| Vecuronium | TBW |
| Rocuronium | TBW |
| Cisatracurium | TBW |
| Succinylcholine | TBW |
| Neostigmine | TBW |
| Fentanyl | TBW |
| Morphine | TBW |
| Remifentanil | TBW |
| Paracetamol | TBW |

Table 1: Drug Dosage in Obese Patients[13]

**IBW (Devine formula)**
Male: 50kg + 2.3kg x (height in inches – 60)
Female: 45.5kg + 2.3kg x (height in inches – 60)

**LBW (James formula)**
Male: 1.1 x weight (kg) – 128 x (weight in kg / height)
Female: 1.07 x weight (kg) – 148 x (weight in kg / height)

## Rapid Airway Management Positioner (RAMP) system in bariatric patients [Fig. 3]




RAMPed position is achieved by arranging pillows underneath the patient's upper body and head (upto $25^0$ head up) until horizontal alignment is achieved between the external auditory meatus and sternal notch. The RAMPed position improves the laryngeal view compared to standard "Sniff" position[14-16] and also reduces the risk of regurgitation and aspiration of gastric contents.

Figure 3: Normal supine position (A) and RAMP position (B)

## Anaesthesia administration

Perioperative management of obese patients for bariatric surgery is challenging. Working as a team – anaesthesiologist, surgeon, physician, dietician, psychologist, nurse can guarantee a higher success rate and fewer complications.

## Goals of anaesthesia

- Adequate relaxation during surgery with no post-op residual weakness
- Excellent anaesthesia and analgesia without respiratory depression
- Avoidance of nausea and vomiting
- Early mobilization and participation in active physiotherapy
- Deep vein thrombosis (DVT) prophylaxis

## Our experience

In the present program, 26 bariatric patients were accommodated for gastric bypass or sleeve gastrectomy with BMI ranging from 37 to 65. All the patients were examined by anaesthesiologist and physician early in the planning process. Necessary investigations were done and perioperative approach for patient care was developed for each patient along with surgical team.

## Pre-operative:

In the pre-anaesthetic checkup, patients were specifically examined for:

- Airway (mallampati grading), neck circumference, neck extension
- Co-morbidities like HTN, IHD, DM, hypothyroid, chronic obstructive pulmonary disease (COPD), asthma, OSA and optimized accordingly
- History of DVT, pulmonary embolism, pulmonary function tests (PFT)
- Blood investigations: Complete blood count (CBC), random blood sugar (RBS), HbA1c, liver function tests (LFT) with coagulation profile, renal function tests (RFT) with electrolytes, thyroid function test, lipid profile, iron profile, Vitamin B12, Vitamin D, blood grouping, serology, Arterial blood gas (ABG).
- Radiological investigations: chest x-ray, USG abdomen, CT scan abdomen
- Urine routine, Electrocardiogram (ECG), ECHO

Any abnormal reports were co-related clinically and patients were optimized accordingly. They were provided counselling regarding diet and psychosocial problems and spirometry training was given to them.

All the patients were reviewed a day before surgery and written consent was taken for general anaesthesia. The nil per os (NPO) time for all patients was six hours fasting for solid food and they were instructed to take their baseline medications except for ACE inhibitors or AT-II antagonist. Injection Clexane 0.4 mg was administered subcutaneously for DVT prophylaxis.

## Intra operative:

The anaesthesia team consisted of 6 anaesthesiologists & 5 anaesthesia technicians.

OT preparation included : RAMP for intubation, intubation trolley (included laryngoscope with blades, video laryngoscope, nasal airways, stylet, bougie), pneumatic system for lower limbs to prevent DVT, soft rolls to protect superficial nerves from external pressure, crape bandages and waist belt for firm fixation, anaesthesia drugs in labelled syringes (dose calculated on the basis of specific drug lipophilicity – Table 1).

For the induction of general anaesthesia, 20G peripheral venous access was established.

All the patients were preloaded with 500 ml crystalloid and injection Paracetamol 1g + $MgSO_4$ 3g administered as pre-emptive analgesic agents.

Monitoring included ECG, heart rate, noninvasive BP, end tidal $CO_2$, anaesthetic gas module (AGM), pulse oximetry.

All the patients were given injection Pantoprazole, injection Ondansetron, injection Dexamethasone as postoperative nausea and vomiting (PONV) prophylaxis and pre-oxygenated with 100% $O_2$ for three minutes.

Injection Ceftriaxone 2g was the prophylactic antibiotic of choice. Induction was done with injection Fentanyl and injection Propofol. The choice of intubation technique (conventional laryngoscopy or video laryngoscope), under the muscle relaxant injection Cisatracurium, was at the discretion of the anaesthesiologist to whom the case was assigned.

Second peripheral venous access was obtained after intubation and pneumatic compressive device was applied to lower limbs to prevent DVT. Anaesthesia was maintained with $O_2$+ $N_2O$+ Desflurane + injection cisatracurium infusion.

Controlled ventilation either with volume or pressure mode resumed after recruitment phenomenon to limit $P_{max}$ <= 30 cm $H_2O$ and to maintain $EtCO_2$ between 35 - 45, $FiO_2$ 0.5, MAC 1.0.

Injection Diclofenac was given at the time of gastrojejunal (GJ) anastomosis, if no contraindication.

Muscle relaxation was reversed at the end of surgery with injection Neostigmine + glycopyrrolate. All the patients were successfully extubated in RAMP on table.

## Post-operative:

Post operatively patients were monitored in post-anaesthesia care unit (PACU) for 2 hours.

Multi modal analgesia was the goal which was initiated with pre-emptive analgesia. All the patients were wide awake with intact airway reflexes. They were ambulated 2 hours post-surgery and started liquids on first post-operative day. Patients were successfully discharged on third post-operative day.

In conclusion, we found that though bariatric patients pose a special challenge to treating anaesthesiologist, anaesthetising 26 bariatric patients in a day with stable intra-operative haemodynamics and smooth recovery without any complications is only possible with multi- disciplinary team approach and pre-operative optimization of patients.

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Anaesthesia Team

# Intraoperative Neuromonitoring As A Saviour Of Facial Nerve In Acoustic Tumours

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**Dr Sandip Modh** (MS, MCh)

Original Article

## Abstract

During surgery of acoustic tumours it is very important to preserve the facial nerve, which is at high risk of damage due to its proximity to the surgical site. Intraoperative neuromonitoring (IONM) significantly decreases facial nerve morbidity during acoustic neuroma surgery. Though there have been advances in surgery and monitoring, IONM can be of great help to predict long-term facial nerve outcomes and thus modify the timing of rehabilitation.

## Introduction

Acoustic Neuroma, also known as Vestibular Schwannoma, is a benign (non-cancerous), slow growing tumour that develops from the vestibulo-cochlear nerve (balance and hearing nerves) supplying the inner ear due to overproduction of Schwann cells and grows to affect the hearing and balance nerves, usually causing unilateral (one-sided) or asymmetric hearing loss, tinnitus, and dizziness/loss of balance. As the tumour grows, it interferes with the face sensation nerve (the trigeminal nerve), causing facial numbness.[1,2]

Magnetic resonance imaging (MRI) scans are critical in the early detection of a Vestibular Schwannoma and are helpful in determining the location and size of a tumour and in planning its microsurgical removal.

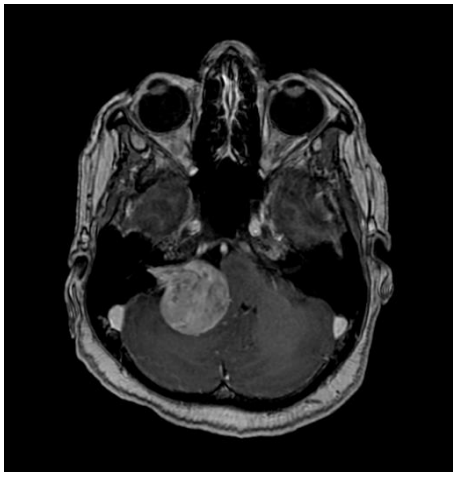


Fig 1: MRI image showing right CP angle tumour

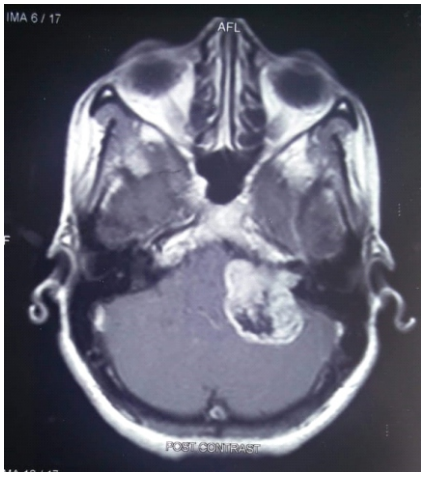



Fig 2: MRI image showing left CP angle tumour

There are three ways of managing Vestibular Schwannoma which include surgical removal, radiation, and observation, in selected group of patients. Of these, surgical removal of Vestibular Schwannoma can lead to nerve injury, depending on size and consistency of tumour, which eventually either leads to loss of hearing or facial paralysis or cause dizziness/loss of balance.

Facial nerve paralysis associated with cerebellopontine (CP) angle surgery has been reported to range up to 26% in a recent series.[3] So, anatomic preservation of the facial nerve, with maximal facial function, is one of the goals of acoustic neuroma surgery.[4] A review series of 221 cases and another with 508 cases has shown that despite improvements in microsurgical technique and the use of intraoperative electrophysiological monitoring, the potential for facial and cochlear nerve injury remains a possibility in the resection of Vestibular Schwannoma.[5,6] However, the use of intraoperative facial nerve monitoring during excision of CP angle tumours has significantly improved anatomic and physiologic preservation of the facial nerve[7] and helps reduce the incidence of facial paralysis. Permanent facial palsy has significant impact on patients functional, cosmetic and emotional wellbeing. Also, exposure keratitis, which eventually leads to visual loss of affected eye can be devastating.

The likelihood of successful preservation of facial and cochlear nerve function during acoustic neuroma surgery has been improved by the advent of intraoperative monitoring techniques.[8]

## Intraoperative Neuromonitoring (IONM)

IONM can be useful in the perioperative period for patients at high risk of developing neurological complications from surgery and is now becoming an integral part of many surgical procedures.[9,10] Intraoperative facial nerve monitoring aids in determination of the nerve displaced by tumour impairment, detects nerve injury during dissection, and provides a means for assessing nerve function after dissection is complete.

The first use of intraoperative neurophysiological testing dates back to the 1930s, when direct cortical stimulation was performed in order to identify the motor cortex of patients with epilepsy[9,11]; however, it was only with the development of the commercial IONM machine in the early 1980s that the technique became widely used.[9,12]

Intraoperative electromyography alerts the surgeon to facial nerve proximity and potential injury. Direct nerve stimulation is utilized to confirm the location and integrity of the nerve.[4] To predict acute and final facial nerve function following acoustic neuroma resection, the lowest current applied to the facial nerve at the brainstem necessary to elicit facial muscle response was measured using strain gauge and electromyographic facial nerve monitors.[13]

A review of many cases have shown that meticulous microsurgical dissection of and around the facial and cochlear nerves with the aid of intraoperative electrophysiological nerve monitoring in the retrosigmoid approach allows for near-total resection of medium and large Vestibular Schwannoma with the possibility of preservation of facial and cochlear nerve function.[5,6] Facial nerve stimulation and monitoring during acoustic tumour removal is a safe and reliable method of locating and protecting the facial nerve during CP angle surgery.[4]

## Modalities

The recent developments of new devices and advances in anaesthesiology have greatly improved the utility and accuracy of IONM. The basic principles of the electrophysiological methods employed under IONM in the operating room include motor evoked potentials (MEPs), somatosensory evoked potentials (SSEPs), electroencephalography (EEG), electromyography (EMG), brainstem auditory evoked potentials (BAEPs), and visual evoked potentials.[9] These modalities can be used in isolation or in combination depending on the structures that are at risk during surgery.

Several cases have been reported in literature where intramuscular EMG electrodes have been used to detect subclinical electrical responses that were amplified and made audible to the operating surgeon after gating stimulus artifacts[3] Intraoperative EMG monitors motor cranial nerves, spinal or peripheral nerves at risk by looking at either the spontaneous or evoked compound muscle action potentials (CMAPs) of the corresponding effector muscles.

Spontaneous EMG records free-running electrical activities from muscles, which is normally of low frequency and amplitude. When the nerve is stretched or irritated, high-frequency neurotonic discharges will be produced, which alerts the surgical team of potential motor nerve damage. The absence of such discharges (i.e. a ''negative response'') suggests either an intact nerve or total denervation disrupting all nerve conduction.

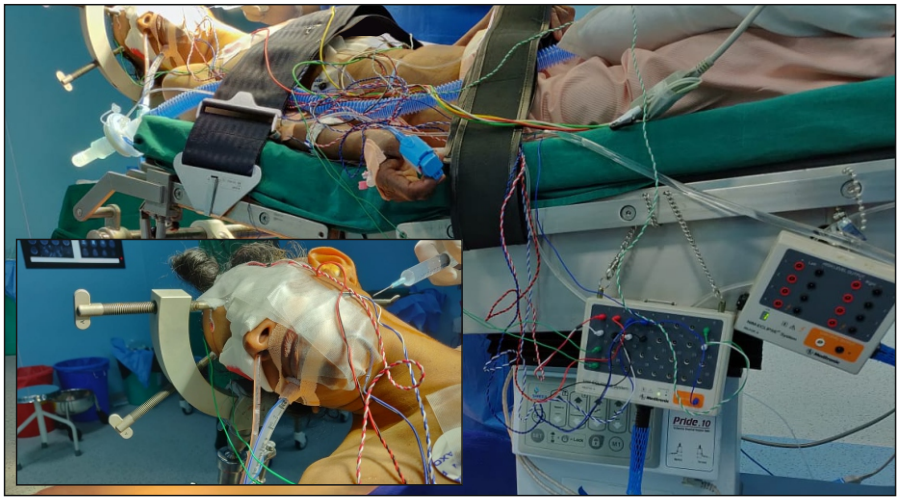


Fig 3: Operation room set up and patient positioning during IONM assisted resection of giant vestibular schwannoma

Triggered EMG, on the other hand, is produced by direct, intentional stimulation of peripheral or cranial nerves, with the resulting CMAP recorded from the corresponding innervated muscles. A positive CMAP from an appropriately applied stimulation will help to identify nerve structures when visual differentiation is difficult (e.g. due to tumour invasion) and to confirm integrity of the nerve distal to the stimulation.

## Anaesthesia considerations

There are special anaesthetic considerations for IONM. Many anaesthetic agents produce dose-dependent suppression of evoked potentials, making it essential for the anaesthetist to choose a regimen compatible with the proposed IONM modality. Anaesthetist should provide a stable physiological and anaesthetic milieu to facilitate meaningful interpretation of signal changes and accurate surgical guidance.

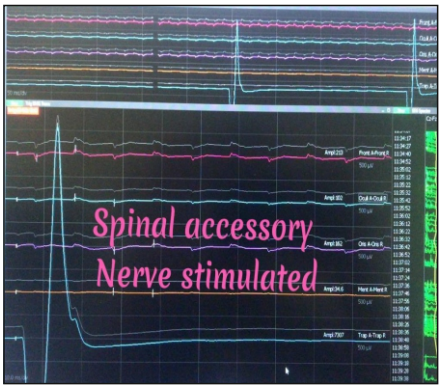
Total intravenous anaesthesia is used without muscle relaxant for acoustic neurona surgery as muscle relaxant affects the EMG monitoring which inhibits the electrical activities across the neuromuscular junctions,

affecting signal recording as muscle contraction can no longer be generated upon neural stimulation. Nitrous oxide is also not used as it causes haematologic abnormalities and its effect is associated with an increase in postoperative leukocyte levels.[8,14]

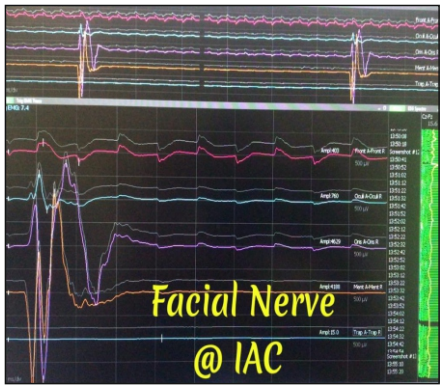
The inhalation agents used are maintained up to 0.4 MAC (minimum alveolar concentration of anaesthetic at 1 atmosphere) throughout the surgery. It is described as a measure of anaesthetic potency for a number of agents in human. The alveolar concentration of the agent is assumed to be in equilibrium with that in the brain. Agents like Propofol starting with 2 mg/kg bolus dose followed by 6mg/kg/hr infusion, Dexmedetomine starting with 0.5 microgram/kg bolus slowly over 15 min followed by 0.2 microgram/ kg/ hr, and Fentanyl starting with 2 microgram/kg bolus followed by 0.5/kg/hr can be used for such procedures.

## Procedure

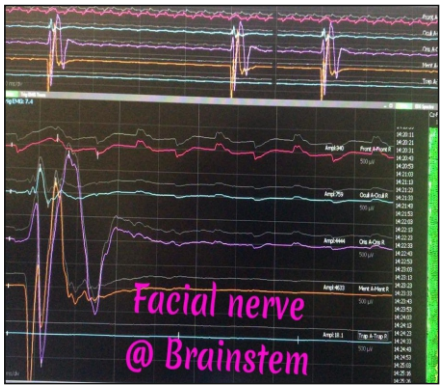
After intubation, dual needles are placed in the facial musculature supplied by the facial nerve and the raw EMG will be recorded through out the procedure. The surgeon will be updated about any EMG activity recorded in the muscles. The stimulating probe is handed over to the surgeon for triggered EMG to distinguish between the nerve tissue and the tumour tissue. At the end of the surgery the facial nerve is checked at the root entry zone at the brainstem level and also at the distal end.



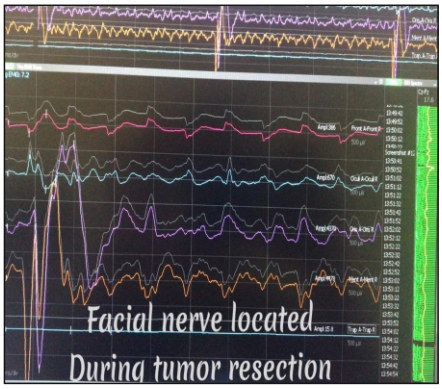

Stimulation of spinal accessory nerve caudal to tumour




Stimulation of Facial nerve lateral to tumour during tumour resection




Stimulation of Facial nerve Medial to tumour during tumour resection




Stimulation of Facial nerve inside the tumour during resection


Post resection: Complete preservation, suggesting physiological integrity

Fig 4: Facial Nerve stimulation signals during various stages of tumour resection. Showing consistent responses throughout, and at conclusion of surgery. This reflects in satisfactory anatomical preservation of facial nerve

Mechanical irritation of the nerve during surgery causes increased EMG activity, which can be detected in real time using a loudspeaker. Brief episodes of activity associated with specific surgical manoeuvres aid the surgeon in avoiding damage to the nerve, whereas prolonged tonic EMG activity may reflect significant neural injury. Electrical stimulation with a hand-held probe elicits evoked EMG responses, which can be used to locate and map the nerve in relation to the tumour. The threshold for eliciting evoked EMG responses provides a rough indicator of the functional status of the nerve.[8]

The ability to elicit EMG responses from low amplitude stimulation of the facial nerve at the brain stem after tumour removal is a reasonable predictor of postoperative facial function.[8] The House-Brackmann classification has been used to assess the intraoperative stimulation-current thresholds and shown that intraoperative threshold testing can be used to predict the facial nerve function.[6,13] Seventeen patients had an excellent facial nerve result (Grade I or II using the House 6-point scale).[4]

While preoperatively, the size of the tumour is the most critical factor in predicting long-term facial function, postoperatively, the proximal seventh nerve stimulation threshold at the end of the surgical procedure can be used as one prognostic measure of long-term facial nerve function.[5]

## Our experience

We operated two cases of left and right-sided CP angle tumours that were surgically excised with IONM. This helped in preservation of facial nerve in acoustic tumour surgery

## Case 1

In a 45-year-old female patient having throbbing headache, blurred vision, and mild facial weakness since the last 2-3 months with visible left CP angle tumour in MRI reports was operated using left sub-occipital craniotomy and micosurgical excision of tumour was done under facial nerve monitoring for left CP angle tumour.

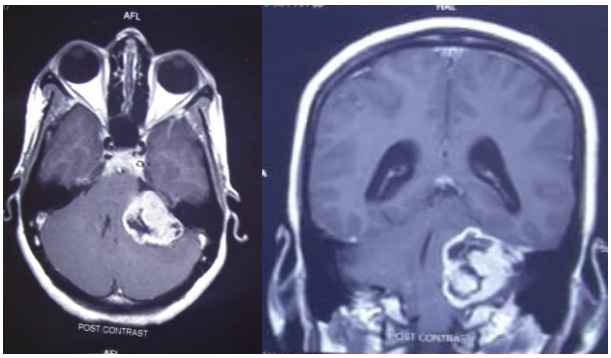



Fig 5: Pre Operative MRI (Gado enhanced T1 study) showing heterogeneously intense enhancing tumour in left CP angle with IAC extension, brainstem distortion, and early hydrocephalus

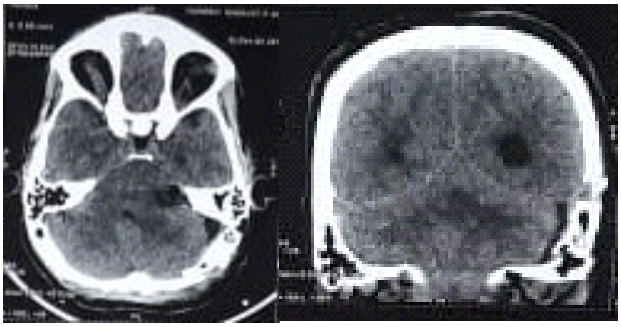


Fig 6: Post Operative day 1 CT scan showing satisfactory tumour resection with CSF filled cavity and resolution of hydrocephalus

Fig 7: Immediate post operative image of patient showing complete functional preservation of facial nerve, along with lower cranial nerves.

Using EMG, needle probes were inserted into the Orbicularis Oculi, Orbicularis Oris, and Masseter. The results deduced from the monitoring suggested that 100% function of the facial nerve was preserved and the patient was haemodynamically stable at the discharge.

## Case 2

A 63-year-old female patient having disturbed gait, impaired hearing on right side, right face numbness, and blurred vision since 2 months showed right CP angle schwannoma with developing hydrocephalous. Right retro-mastoid craniotomy with total removal of the schwannoma from right CP angle was performed under general anaesthesia. The facial nerve was monitored performed using EMG intraoperatively and the results deduced from the monitoring suggested that 100% function of the facial nerve was preserved. At the time of discharge patient was haemodynamically stable, patient was conscious, taking orally, normal cough reflex, right hearing was impaired (pre-op), mild cerebellar ataxic gait.

Thus, IONM has proved to be a saviour of facial nerve in acoustic tumour surgery and should be extensively used for preservation of the nerves.

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# A Review Of High Flow Nasal Cannula In Adults And Children

**Dr Tushar Patel** (MD)
**Dr Shweta Gargiya** (DNB)
**Dr Snehal Patel** (DNB)

Review Article

## Abstract
High Flow Nasal Cannula (HFNC) is a relatively new and well-tolerated non-invasive ventilation therapy that is being used increasingly both in paediatric and adult care settings. We give here a brief introduction and share its mechanism of action and uses while taking into consideration its indications, contraindications, advantages, and complications and share our experience of using it in adult as well as paediatric patients.

## Introduction
Oxygen is the first-line therapy for hypoxemic respiratory failure and is usually delivered through nasal cannula or a face mask. More recently, there has been increased interest in the use of high-flow nasal cannula (HFNC) oxygen therapy, in which optimally heated and humidified oxygen is delivered at high flow rates of up to 60 L/min.

HFNC oxygen therapy comprises an air/oxygen blender, an active humidifier, a single heated circuit, and a nasal cannula.

The FLORALI trial (2015) demonstrated the effectiveness of a new method of oxygen delivery called high-flow nasal cannula in a well-defined subset of patients in acute respiratory failure: those with hypoxemia and without hypercapnia.[1] In this randomized controlled trial, high-flow oxygen therapy had a significant improvement in 90-day mortality compared to either noninvasive ventilation or standard oxygen therapy (12% vs 28% vs 23%). While there was no significant reduction in intubation rate overall, patients with more severe hypoxemia, PaO2:$FiO_2 \leq$ 200 mm Hg, did experience a significant reduction in intubation rates with high-flow oxygen therapy, which may have driven this mortality benefit.

In paediatric patients as well, HFNC use continues to increase as the system is easily set up and well tolerated by the patients.[2] In fact, it has become the most popular device in neonatology and is gradually replacing nasal continuous positive airway pressure (CPAP). Different sizes of nasal cannulas are available for delivering different maximum flow as per the size of the baby.

## Mechanism of action
Alveolar oxygen delivery depends on supplemental oxygen flow rate, the fraction of inspired oxygen ($FiO_2$) delivered in supplemental flow, the device's interface with the patient, and inspiratory demand. during quiet breathing, inspiratory flow rates are approximately 30 litres per minute, which exceeds supplemental oxygen flow . Thus, room air containing 21% $FiO_2$ is entrained to meet inspiratory demand, which dilutes the total $FiO_2$ of the inspiratory flow. During respiratory distress, flows reach 100 litres per minute or more, resulting in entrainment of much larger volumes of room air that further reduce delivered $FiO_2$. The HFNC overcomes flow limitations of low- and intermediate-flow devices by delivering up to 60 litres per minute of heated, humidified gas via nasal prongs HFNC produces flow-dependent $CO_2$ clearance that reduces anatomic dead space and leads to improved work of breathing and lower respiratory rates.

In neonates, heated and humidified mixture of air and oxygen is delivered at flow rates of 2 L/kg/min which provides distending pressure and decreased work of breathing (WOB).[3]

## Physiological effect[4,5]
1. High flow washes out carbon dioxide in anatomical dead space.
2. Although delivered through an open system, high flow overcomes resistance against expiratory flow and creates positive nasopharyngeal pressure. While the pressure is relatively low compared with closed systems, it is considered adequate to increase lung volume or recruit collapsed alveoli.
3. The difference between the inspiratory flow of patients and delivered flow is small and $FiO_2$ remains relatively constant.
4. Because gas is generally warmed to 37°C and completely humidified, mucociliary functions remain good and little discomfort is reported.

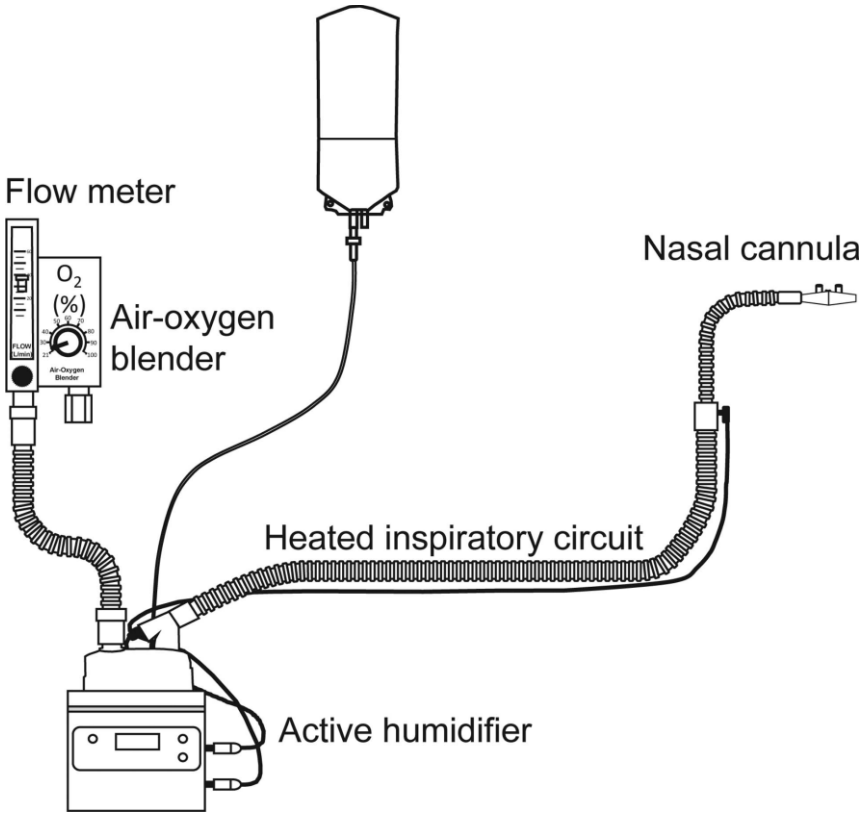


Figure 1: Basic setup for high-flow nasal cannula oxygen delivery[6]

## Clinical uses of HFNC

The HFNC is very versatile and user friendly. It can be used in a low-monitoring environment, several potential clinical uses for the HFNC have emerged in recent years. Among these are included the respiratory support of patients:

1. With acute hypoxemic respiratory failure or respiratory distress syndrome (ARDS),
2. With respiratory compromise induced by heart failure
3. With respiratory compromise post-extubation.
4. As an adjunct during airway instrumentation like bronchoscopy
5. Who need pre oxygenation before intubation
6. Who are immune compromised
7. Needing palliative care
8. Including neonates who are premature and having respiratory distress syndrome using the INSURE technique in which INtubation, SURfactant, and EXtubation are done
9. Including children with viral bronchiolitis and asthma, post extubation in respiratory and post cardiac surgery patients.

## Advantages

1.Better patient communication
2.Less anxiety and claustrophobia
3.Better secretion clearance
4.Superior comfort compared with non-invasive ventilation (NIV) and face masks
5.In neonates, low fractioned $O_2$ reduces chances of retinopathy of prematurity (ROP)

## Predictors of High-Flow Nasal Cannula Treatment Failure in Patients with Acute Respiratory Failure[7,8]

Signs that pretend the need for mechanical ventilation include
1.Persistently high respiratory rates
2.Ongoing hypoxemia
3.Thoracoabdominal asynchrony (e.g., abdominal breathing),

Respiratory rate - oxygenation (ROX) index, defined as the ratio of $SpO_2/FiO_2$ to respiratory rate) at 12 hours may be useful in determining who can safely continue HFNC therapy, but it cannot be used to identify for whom HFNC therapy will fail.[7]

## How to use HFNC

Two parameters need to be set:

- The flow rate
- The $FiO_2$

We prefer to set the flow rate first, typically at 20 to 35 L/minute (range 5 to 60 L/minute). The $FiO_2$ (range 21 to 100 percent) is next set to target a desired peripheral oxygen saturation. The flow rate can subsequently be increased in 5 to 10 L/minute increments if the respiratory rate fails to improve, oxygenation fails to adequately improve, or breathing remains laboured. Increasing the flow rate and $FiO_2$ will both result in improved peripheral oxygen saturation; we prefer to maximize the flow rate first in an attempt to keep the $FiO_2$ $\leq 60\%$; however, an increase in $FiO_2$ may be necessary to achieve adequate oxygenation.

HFNC is generally well tolerated and can be administered for prolonged periods (eg: days). Patients switch to conventional low-flow nasal cannula system once the flow rate reaches $\leq$20 L/minute and $FiO_2 \leq 50\%$.

In paediatrics, gas temperature is set at 37°C, flow rate is set at 2 L/kg/min, and $FiO_2$ 21%-100% as per the targeted oxygen saturation.

## Contraindications

Abnormalities or surgery of the face, nose, or airway that preclude an appropriate-fitting nasal cannula

## Complications

1.Nasal mucosal irritation (infrequent)
2.Runny nose
3.Feeling hot
4.Alteration of smell (infrequent)
5.Dislocation of the nasal cannula (infrequent)
6.Risk of delayed intubation
7.Abdominal distension
8.Air leak in paediatric patients and neonates (due to inappropriate prong size that occludes nostril lumen)

Compared to conventional oxygen therapy, HFNC reduced the rate of intubation, mechanical ventilation and the escalation of respiratory support. When compared to NIV, showed no better outcomes.

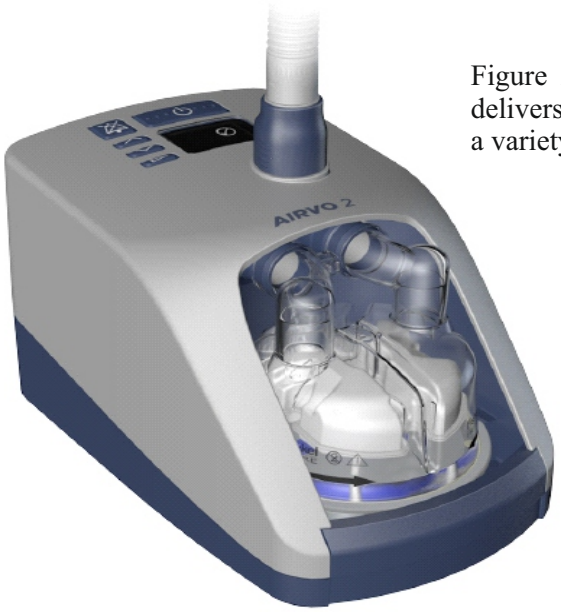


Figure 2: Airvo 2 humidifier with integrated flow generator that delivers high flow warmed and humidified respiratory gases through a variety of patient interfaces

## Our Experience

A 55 year old female being treated in isolation for H1N1 and having respiratory distress was not tolerating NIV. So, HFNC was used. Patient recovered and no additional intubation was needed. A premature, 29 weeks neonate was kept on HFNC post-extubation and baby tolerated it well. Post total anomalous pulmonary venous circulation (TAPVC) surgery, post-extubation 4 months baby was kept on HFNC and did well.

## Conclusion

HFNC is a newly evolving therapy for various respiratory disorders of adults and children. It is slowly replacing invasive ventilatory modalities and is more patient friendly. So, wherever indicated, its use can prove to be beneficial for the patient.

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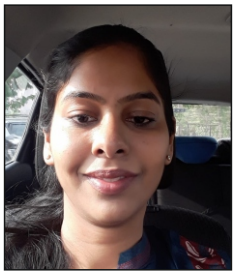


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# Overview Of Renal Cell Carcinoma

**Dr Shrenik Shah** (MS, MCh)

Review Article

## Introduction

Renal cell carcinoma (RCC) is the most common type of kidney cancer in adults, responsible for approximately 90–95% of cases.[1] RCC originates from the lining of the proximal convoluted tubule, a part of the very small tubes in the kidney that transport urine. When the cancer has not metastasised or burrowed deeper into the tissues of the kidney, the five-year survival rate is 65-90%[2], but this is lowered considerably when the cancer has spread.

## Signs and Symptoms

Today RCC is often asymptomatic and is generally detected incidentally when a person is being examined for other ailments. Classic triad (haematuria, flank pain, and an abdominal mass) only occurs in 10–15% of cases and it represents advanced nature of disease.[3]

Other signs and symptoms include:

- Loin pain
- Malaise, weight loss, and loss of appetite
- Anaemia resulting from depression of erythropoietin
- Varicoceleflank - more often the left testis
- Hypertension resulting from secretion of renin by the tumour
- Hypercalcemia
- Sleep disturbance or night sweats; recurrent fever; and chronic fatigue

## Risk factors

**Lifestyle**[3,4]

- Smoking
- Obesity
- Hypertension

50% of cases

- Chemical exposure (asbestos, cadmium, lead, chlorinated solvents, petrochemicals and
- PAH (polycyclic aromatic hydrocarbon)
- Long term use of non-steroidal anti-inflammatory drugs (NSAIDS).

**Genetics**[3,4]

Hereditary factor (individual with immediate relatives) - A two to fourfold increased risk

## Other genetically linked conditions

- Hereditary papillary renal carcinoma
- Hereditary leiomyomatosis
- Birt-Hogg-Dube syndrome
- Hyperparathyroidism-jaw tumor syndrome
- Familial papillary thyroid carcinoma
- Von Hippel-Lindau disease
- Sickle cell disease

Patients with acquired disease of the kidney requiring dialysis are 30 times more likely than the general population to develop RCC.[4]

## Classification of RCC[5]

| Classification | Percentage | Cell of origin | Molecular basics |
|---|---|---|---|
| **Clear cell carcinoma** | 75–85 | Proximal tubule | Chromosome 3p– |
| **Papillary carcinoma (chromophilic)** | 10–15 | Proximal tubule | +7, +17, –Y |
| **Chromophobe** | 5–10 | Cortical collecting duct | Hypodiploid |
| **Oncocytic** | 3–7 | Cortical collecting duct | Undetermined |
| **Collecting duct of Bellini** | Very rare | Medullary collecting duct | Undetermined |
| **Unclassified** | 5 | – | Undetermined |

## Diagnosis

Diagnosis of RCC is based on detail medical history and physical examination supplemented by blood and urine test with radiological investigation.

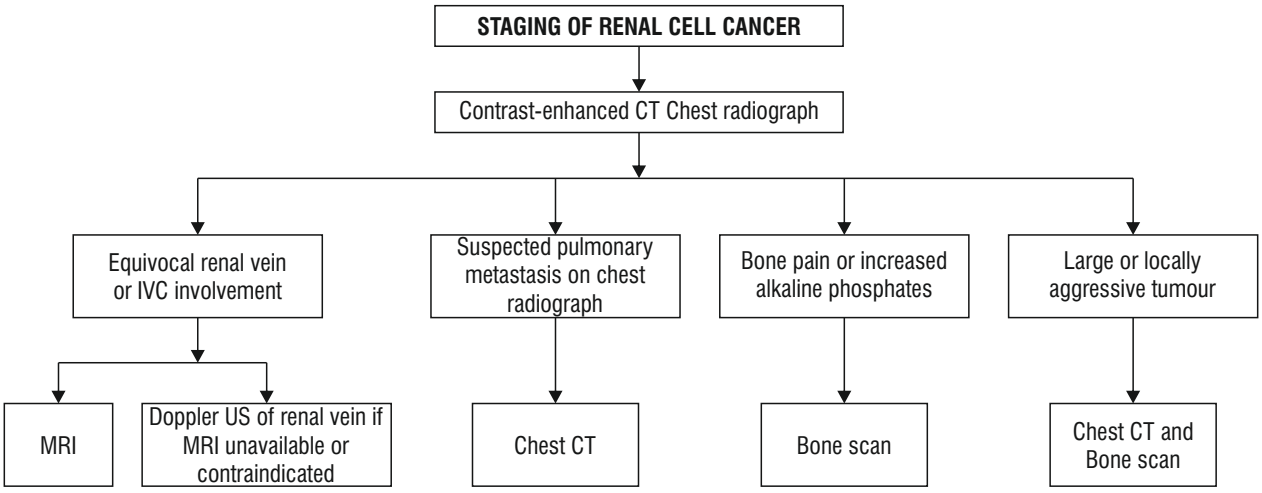
## Laboratory studies

CBC, RFT, LFT, S. Electrolytes, Urine (routine and microscopy)

## Radiological workup

With improvements in the use of imaging technology, the detection of renal lesions has increased.

- **USG:** Excellent for differentiating cystic from solid mass.
- **CT Urography:** Mainstay radiological investigation used for staging and to evaluate contralateral kidney function.
- **MRI:** Investigation of choice to demonstrate the extent of renal vein involvement.




Flowchart 1: Stage wise radiological work up[5]

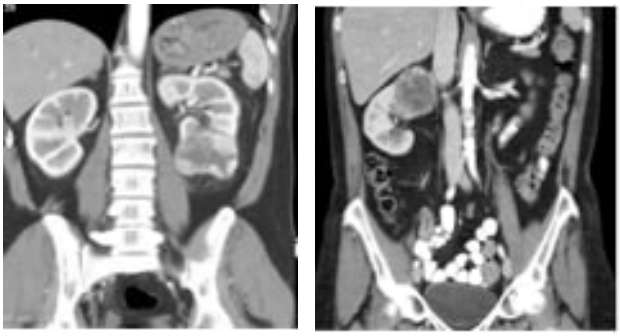


Figure 1: CT image of RCC

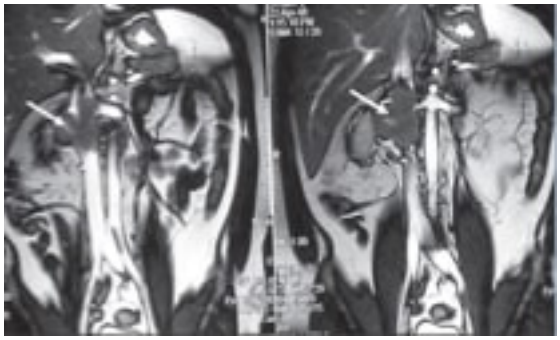
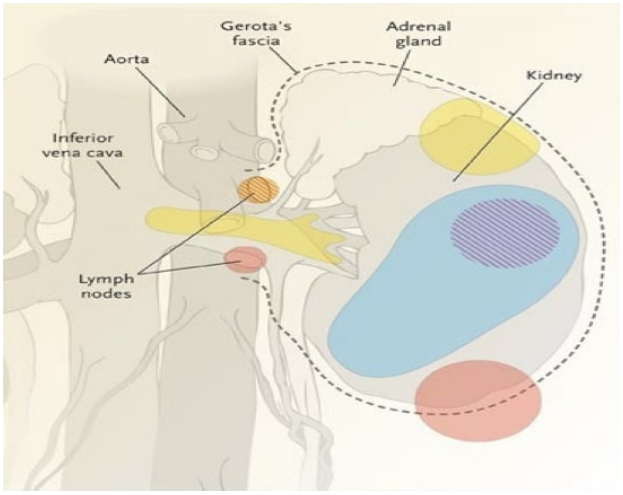


Figure 2: MRI – IVC involvement

## Staging[6]




**Stage I**
Tumour <7 cm in greatest dimension and limited to kidney: 5-year survival, 95%

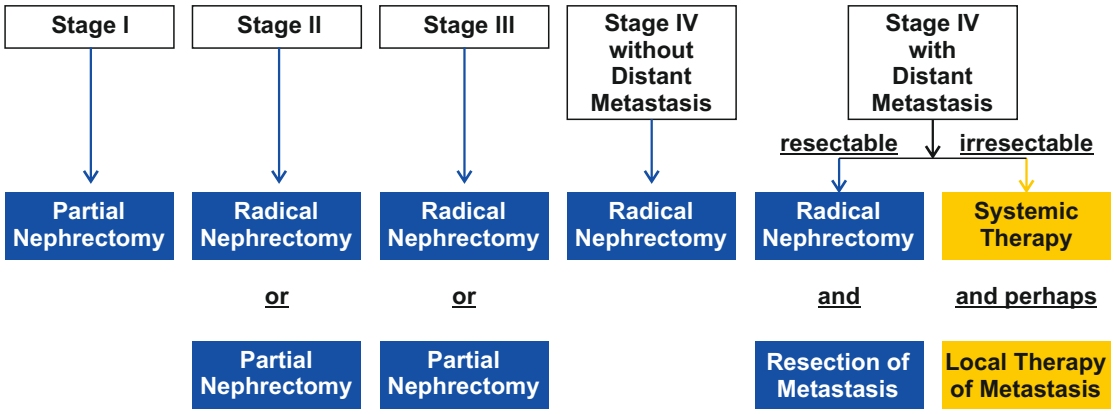
**Stage II**
Tumour <7 cm in greatest dimension and limited to kidney: 5-year survival, 88%

**Stage III**
Tumour in major veins of adrenal gland, tumour within Gerota's fascia, or 1 regional lymph node involved: 5-year survival, 59%

**Stage IV**
Tumour beyond Gerota's fascia or >1 regional lymph node involved 5-year survival, 20%

## Treatment

Surgery is the mainstay treatment of RCC even in advance stages if resectable.




Flowchart 2: Stage wise surgical management[5]

Surgery is done by traditional OPEN technique or by MINIMAL INVASIVE SURGERY (LAPROSCOPY OR ROBOTICS).

Minimally invasive surgery has the advantages of being cosmetic, less painful, less expensive, decreased length of stay at hospital, and early return to work.

There is no difference in overall and cancer specific survival between open and minimal invasive technique.

Therapy for metastatic RCC is almost always applied for palliative reasons.[7] Immunotherapy with interferon alpha or interleukin-2 used to be the standard in the last two decades. However, the efficacy of this therapy is rather low. Distinct progress including a significant prolongation of progression-free survival was made with the multikinase inhibitors axitinib, pazopanib, sorafenib, and sunitinib, the mTOR kinase inhibitors everolimus and temsirolimus, as well as the angiogenesis-inhibitory VEGF antibody, bevacizumab.

## Follow Up

A generally applicable follow-up program does not exist. The relapse risk depends on the stage of the tumour at the time of initial diagnosis. The majority of relapses occur within the first two months. As the patient's life expectancy in relapse is influenced by the extent of metastization, monitoring the course of the disease with imaging techniques appears to be a reasonable course of action.

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# Multiparametric MRI Prostate In Biopsy Naive Patients

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Review Article

## Introduction

Studies have shown that prostate cancer (CA prostate) is the second most frequently diagnosed cancer in men and sixth most common cause of cancer deaths.[1]

Currently, the diagnostic pathway for prostate cancer detection is initiated on prostate-specific antigen (PSA) level and digital rectal exam (DRE). Use of PSA as a screening tool followed by systematic transrectal ultrasound-guided (TRUS) biopsy has resulted in increased detection of prostate cancer with stage migration toward low-risk disease.

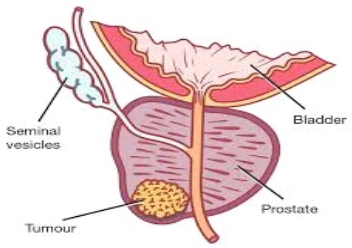


Figure 1: Anatomy of CA Prostate

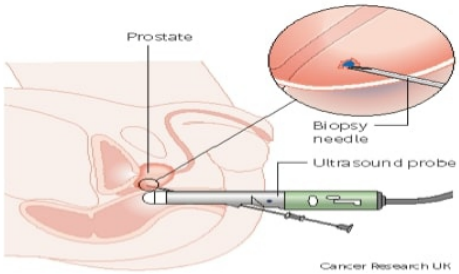


Figure 2: TRUS guided biopsy technique

But a biopsy can result in complications such as infection, bleeding, or pain. Moreover, anterior and apical tumours tend to be missed by TRUS biopsy until they grow to a substantial size and reach within 15–20 mm from the posterior margin of the prostate, leading to delayed diagnosis.[2]

The role of MRI has evolved over the past decade with the development of newer techniques to localize, stage, and obtain functional information about the tumour and avoid biopsy in selected low risk patients.

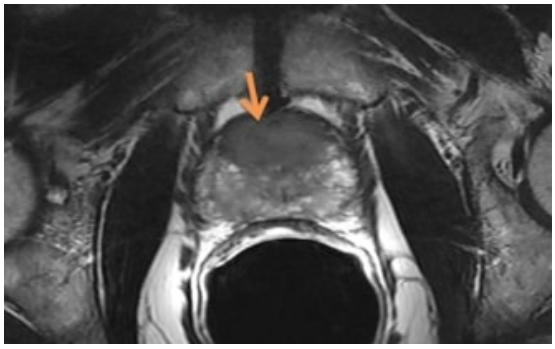

Figure 3: MRI image with arrow indicating the suspicious lesion

Multi-parametric magnetic resonance imaging (mp-MRI) used as a triage test might allow men to avoid unnecessary TRUS-biopsy and improve diagnostic accuracy.This consists of anatomic and functional imaging techniques.

Anatomical imaging includes T2 Weighted (T2W) imaging and Apparent Diffusion Coefficient (ADC) imaging while functional techniques include Diffusion Weighted Imaging (DWI) and Dynamic Contrast Enhancement (DCE). With the aid of these techniques mp-MRI provides a highly sensitive and specific imaging.[3]

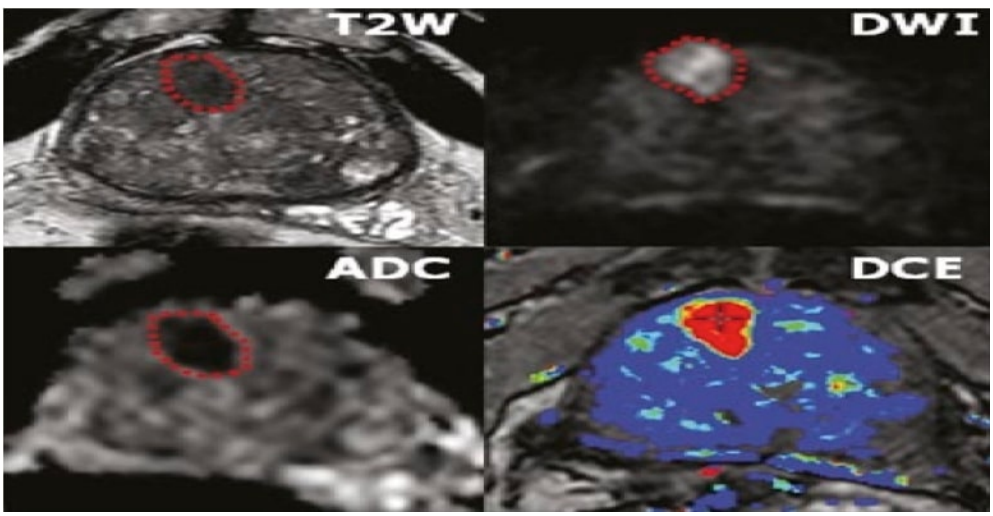


Figure 4: Multiparametric MRI of CA Prostate - anatomic and functional imaging

## Advantages of mp-MRI Prostate

1. Effectiveness of mp-MRI when used along with PSA, followed by targeted biopsy of the MRI-visible lesion, is a better alternative to systematic TRUS biopsy in the diagnostic pathway[3]
2. It decreases the number of missed clinically significant cancers and improves risk stratification; therefore, it provides a more accurate therapeutic option to the patient[4]
3. The MR-invisibility of tumour on mp-MRI could be of prognostic significance in monitoring men in Active Surveillance with potential benefit of tailoring the frequency of surveillance biopsies and reducing the number of unnecessary biopsies[5]

## Prostate Imaging Reporting and Data System (PI-RADS)

It provides a comprehensive yet practical set of guidelines for the interpretation and reporting of prostate mp-MRI that will promote the use of this modality for detecting clinically significant prostate cancer.[6]

| PI-RADS |
| --- |
| PI-RADS 1 = Very low (clinically significant cancer highly unlikely) |
| PI-RADS 2 = Low (clinically significant cancer unlikely) |
| PI-RADS 3 = Intermediate (clinically significant cancer equivocal) |
| PI-RADS 4 = High (clinically significant cancer likely) |
| PI-RADS 5 = Very high (clinically significant cancer highly likely) |

## Our experience

At our centre we do mp-MRI PROSTATE of the patients with Gray Zone S.PSA (4-10 ng/ml) and it has avoided painful and traumatic biopsy procedures in many of our patients.

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# Idiopathic Infantile Cardiomyopathy

**Dr Snehal Patel** (DNB)
**Dr Vishal Changela** (MD, FNB)

Review Article

## Introduction

Cardiomyopathies are known to occur rarely in neonatal and paediatric age group. Though most of the cardiomyopathies are secondary to either structural cardiac defect such as anomalous left coronary artery from the pulmonary artery (ALCAPA)[1,2] or metabolic issues (inborn errors of metabolism)[3]; some cardiomyopathies are idiopathic where there is no association of cardiovascular or systemic disease. Infants with cardiomyopathies usually present with congestive cardiac failure (CCF), arrhythmia, chest pain, or sudden death.[4]

Though cardiomyopathy is rare in children (1.13 cases annually per 100000), it has highly debilitating consequences like heart failure and death.[4-6] Idiopathic dilated cardiomyopathy (IDC) most often affects very young children, the highest incidence being in children under 1 year of age. The course of paediatric cardiomyopathy is often progressive so targeted strategies need to be implemented to stop its progress.

## Idiopathic Cardiomyopathy

IDC is a relatively rare disorder characterised by dilated and poorly contractile ventricles, especially the LV and absence of inflammatory cells in the myocardium.[7] Ventricular dilatation is associated with reduced ejection fraction and increased end systolic volume, as well as, left atrial dilatation.[8] The onset of this condition is insidious and the aetiology is unknown and is probably multi-factorial. Endomyocardial biopsy studies in some patients considered clinically to have IDC have reported a substantial incidence of inflammatory myocarditis and viral infection has also been implicated in the aetiology.[9]

## Aetiology and Diagnosis

The cause of sudden onset CCF during neonatal period may be attributed to a variety of cardiac conditions which include congenital valvular abnormalities, L to R shunts (VSD, PDA) myocarditis and cardiomyopathies.[10] A murmur typical of MR may be present at the apex.[11] ECG does not contribute much to the diagnosis and usually shows nonspecific changes. Chest radiograph demonstrate cardiomegaly of varying proportions

At the time of diagnosis, 71% of children present with clinical signs of heart failure and marked LV dysfunction.[5] Dilated cardiomyopathy (DCM) is primarily diagnosed using echocardiography[8,12] that shows characteristic systolic dysfunction and progressive LV dilation. Echocardiography is the primary source of information for diagnosing and monitoring the disease; for example, measures of systolic versus diastolic diameter (fractional shortening) or volume (ejection fraction) are routinely collected to monitor LV systolic function.[6,8] In the present case also, 2D ECHO showed increased left and right ventricular and left atrial dimensions.

## Treatment

Effective treatment options for DCM in children are limited. Despite advances in the medical management of paediatric heart failure, the ability to restore native cardiac function in this population remains limited.[6] The goal of treatment, however, has not been limited to treating the symptoms, but has focused on reversing this remodelling process that is linked to the progression of heart failure.

## Follow-up

Follow-up of patients with heart failure secondary to DCM focuses on the assessment of symptoms and response to medical treatment, assessment of functional capacity and imaging study (Echo and MRI) to assess the status of the remodelling process. The prognosis of paediatric DCM depends on age at presentation and heart failure status.[6]

## Our Experience

A two months male neonate having cough and cold since 2-3 days with decreased feeding presented after being diagnosed to have a large atrial septal defect (ASD) with left to right shunt and decreased myocardial function. The child was managed aggressively with fluid restriction, inotropes, dobutamine, diuretics infusion, IV Levosimendan and digitalis (Digoxin). Blanket supportive treatment for secondary causes of cardiomyopathies was started in the form of calcium, vitamin D3 supplements, multivitamins, carnitine, and coenzyme Q. Gradually with the treatment, the child's condition improved and he was extubated from ventilatory support. Inotropes were gradually weaned off and IV digoxin was changed to oral digoxin and

supportive medications were continued. Breast feeding was initiated once $O_2$ support was weaned off and respiratory ratio was normal (after 7 days of admission).

The child was called for follow up after 1 week of discharge and 2D ECHO showed ejection fraction of 60%. Supportive treatment was continued for the next 3 months. At present, on a 4 month follow-up, the child is doing well and has achieved the milestones for the age. Last 2D ECHO ejection fraction was 60-65%.

## Conclusion

Though cardiomyopathy in children is rare, it is a serious disorder associated with abnormal cardiac structure and function and poor prognosis. Conservative management with aggressive decongestive therapy helps in symptomatic improvement in such cases.

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# Review Of Pirads V2.0 In Multiparametric MRI Of Prostate And Its Usefulness In Guiding Further Management - Especially Prostate Biopsy - "To Do Or Not To Do"

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**Dr Ronak Patel** (MD, DNB, FRCR)
**Dr Yash Patel** (MD)

Review Article

## Abstract

Multiparametric MRI (MP-MRI) of prostate provides good information and can be used to guide biopsy decisions in men with elevated serum PSA levels. We follow PIRADS v2.0 MP-MRI of prostate for reporting and with own experience of about 50 patients we can conclude that MP-MRI targeted evaluation helps avoid unnecessary biopsy and helps in guiding target areas in biopsy whenever required.

## Introduction

Before the era of MRI when an aged male patient with complain of lower urinary tract symptoms (LUTS) presented, digital rectal exam (DRE) and serum prostate surface antigen (s.PSA) were done. If it is found that the PSA level is raised --- to solve query of benign prostatic hyperplasia (BPH)/ malignancy/ blind biopsy/ transrectal ultrasound (TRUS) scan and guided biopsy were advised which is an invasive procedure and may lead to complications like internal haemorrhage, pain, and rarely infection. Even if done TRUS-guided it is invasive and practically TRUS is not trustworthy to identify malignant/suspicious nodule or lesion accurately as many nodules are isoechoic in appearance on ultrasound.

Something should be a bridge/diversion to avoid unnecessary biopsies and guide biopsy precisely to target areas when required. MRI can be and seems to be an appropriate modality which can act as a bridge cum diversion in our path between biochemistry (raised s.PSA) and biopsy.

## Multi-Parameteric Magnetic Resonance Imaging (MP-MRI)

MP-MRI has emerged and is establishing as a standard imaging protocol for investigating prostate pathologies in patients with raised serum PSA levels.[1]

## On axial T2 weighted (T2W) MRI, normal prostate in a young patient shows zonal anatomy:[2]

- Peripheral zone appears uniformly bright-near homogeneously hyperintense
- Transitional zone appears uniformly intermediate (grey)

The prostate imaging and data reporting system (PIRADS) scale is based on a score from 1 to 5 (which is given for each lesion), with 1 being most probably benign and 5 being highly suspicious of malignancy.

### Peripheral zone

For the peripheral zone the diffusion weighted imaging (DWI)/ apparent diffusion coefficient (ADC) is the primary determining sequence (dominant technique) to assign PIRADS category.[2]

### Transition zone

For the transition zone the T2W imaging is the primary determining sequence (dominant technique) to assign the PIRADS category.[2]

## PIRADS v2.0 T2W - Peripheral zone (PZ)[2]

1: Uniform high signal intensity
2: Linear or wedge-shaped hypointensity or diffuse mild hypointensity, usually indistinct margin
3: Heterogeneous signal intensity or non-circumscribed, rounded, moderate hypointensity; includes others that do not qualify as 2, 4, or 5
4: Circumscribed, homogeneous moderately hypointense focus or mass confined to prostate and < 1.5 cm in the greatest dimension
5: Same as 4 but ≥ 1.5 cm in greatest dimension or definite extraprostatic extension/invasive behaviour

## PIRADS v2.0 T2W - Transitional zone (TZ)[2] [Fig. 1,3]

1: Homogeneous intermediate signal intensity
2: Circumscribed hypointense or heterogeneous encapsulated nodule(s) (BPH)
3: Heterogeneous signal intensity with obscured margins; includes others that do not qualify as 2, 4, or 5
4: Lenticular or non-circumscribed, homogeneous moderately hypointense, and <1.5 cm in greatest dimension
5: Same as 4, but ≥ 1.5 cm in greatest dimension or definite extraprostatic extension/invasive behaviour

**PIRADS v2.0 DWI - Peripheral zone (PZ)** [Fig. 2,3]

1: No abnormality on ADC or DWI
2: Indistinct hypointense on ADC
3: Focal mildly/moderately hypointense on ADC and isointense/mildly hyperintense on DWI
4: Focal markedly hypointense on ADC hyperintense on DWI; < 1.5 cm in greatest dimension
5: Same as 4 but ≥ 1.5 cm in greatest dimension or definite extraprostatic extension/invasive behaviour.

**Following are changes made from PIRADS v1 to v2** [2]

- Determining sequences for PZ and TZ were defined.
- For the PZ, DWI is the primary determining sequence
- For the TZ, T2W is the primary determining sequence
- MR spectroscopy was omitted in PIRADS scoring

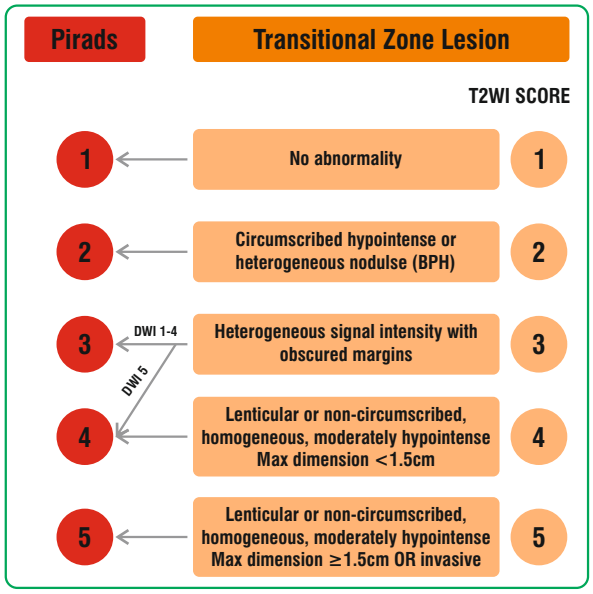



Figure 1: T2W score of prostate lesions in transitional zone—PIRADS categories v2.0[3]

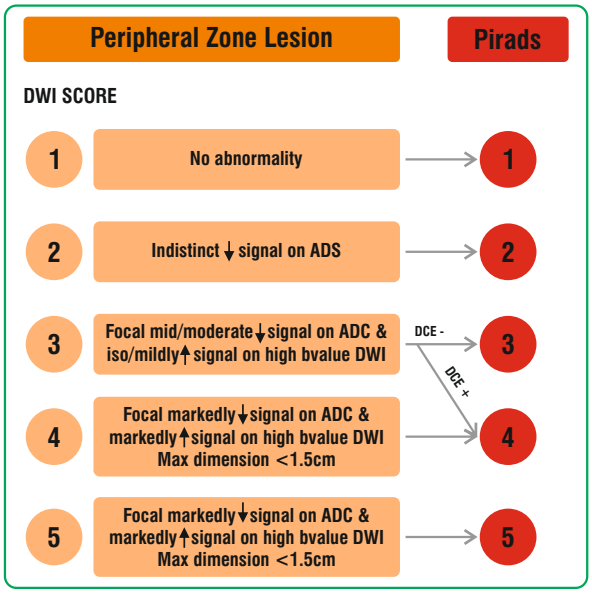



Figure 2: DWI score of prostate lesions in peripheral zone - PIRADS categories v2.0[3]

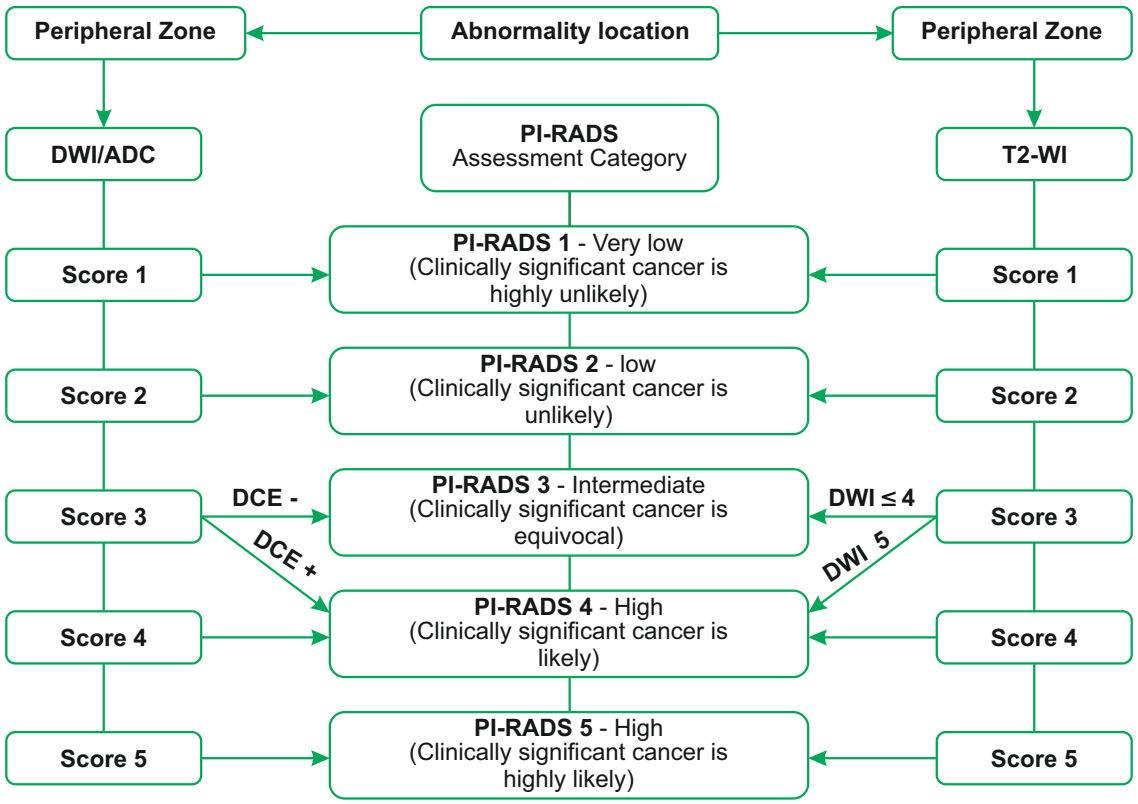



Figure 3: PIRADS scoring and clinical significance[2]

Based on the findings of prostate MP-MRI, the following algorithm/ flowchart [Fig.4] can be used as a guide for further investigations/evaluation of the patient so that accurate diagnosis and management can be targeted.

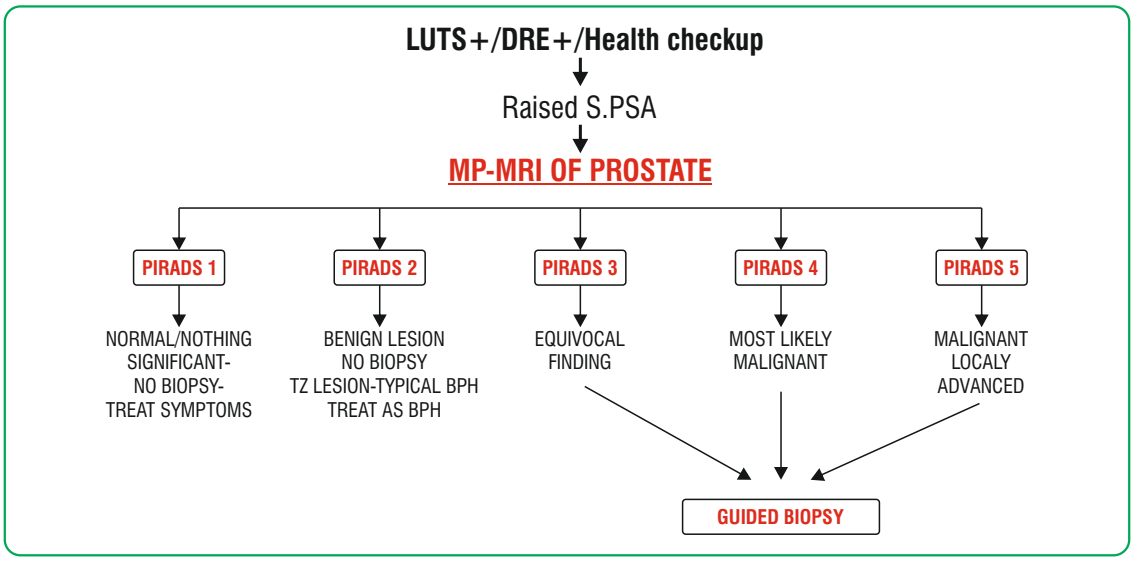
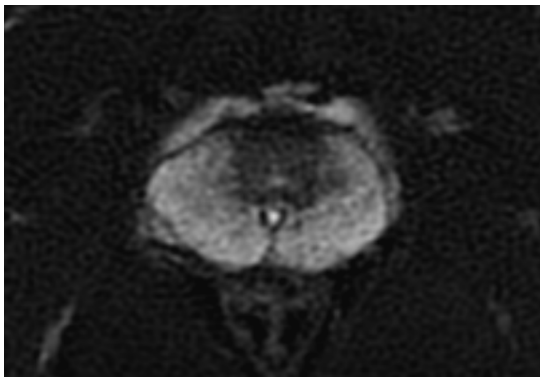



Figure 4: Flow chart showing role of MP-MRI of prostate and grading of prostate lesions with PIRADS categories in guiding further management based on diagnosis[1]

## Our Experience

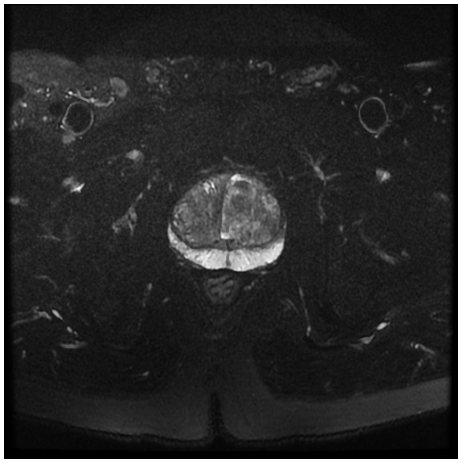
At KD Hospital, we have high quality 1.5 tesla high definition MRI machine with the help of which we have done about 50 cases of MP-MRI and by categorizing prostate lesions according to PIRADS version 2.0 we made our reports and interpretations as per international standards and were able to guide the treating surgeons/ urosurgeons about further management, especially, prostate biopsy- to do or not to do!



Case 1: A patient with a normal appearing prostate (axial T2W): PIRADS 1 PZ and TZ [Fig. 5] needed no further management.

Figure 5: Normal appearing prostate (axial T2W): PIRADS 1 PZ and TZ

Case 2: A patient with axial T2 weighted fat suppressed (T2FS) and T2W images showing PIRADS 2 TZ and PIRADS 1 PZ appearance corresponding to typical BPH [Fig. 6,7] needed medical treatment for BPH but biopsy was not needed.



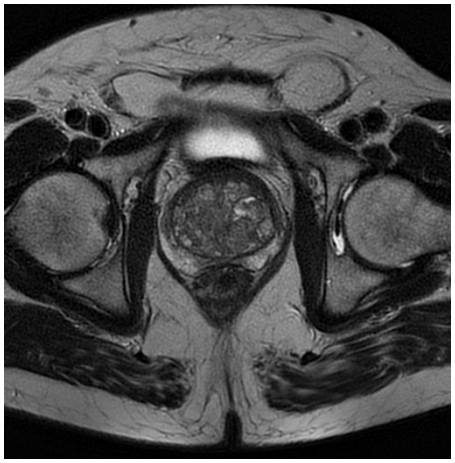


Figure 6,7: Axial T2FS and T2W images showing PIRADS 2 TZ and PIRADS 1 PZ appearance

Case 3: A patient with axial T2W and axial DWI images showing PIRADS 5 lesion and an invasive adenocarcinoma was revealed in biopsy.

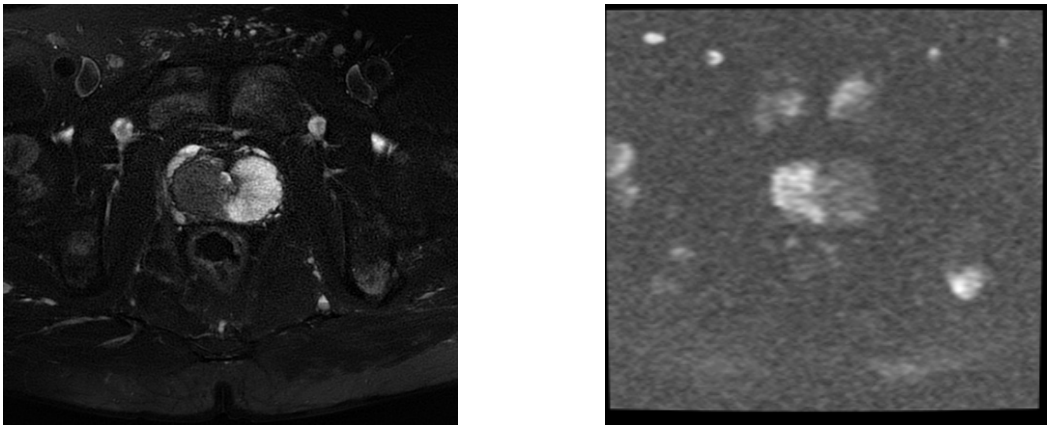


Figure 8,9: Axial T2W and axial DWI images showing PIRADS 5 lesion

Case 4: A patient with axial T2W and axial DWI images showing PIRADS 4 lesion and prostate intraepithelial neoplasia (PIN) revealed in biopsy.

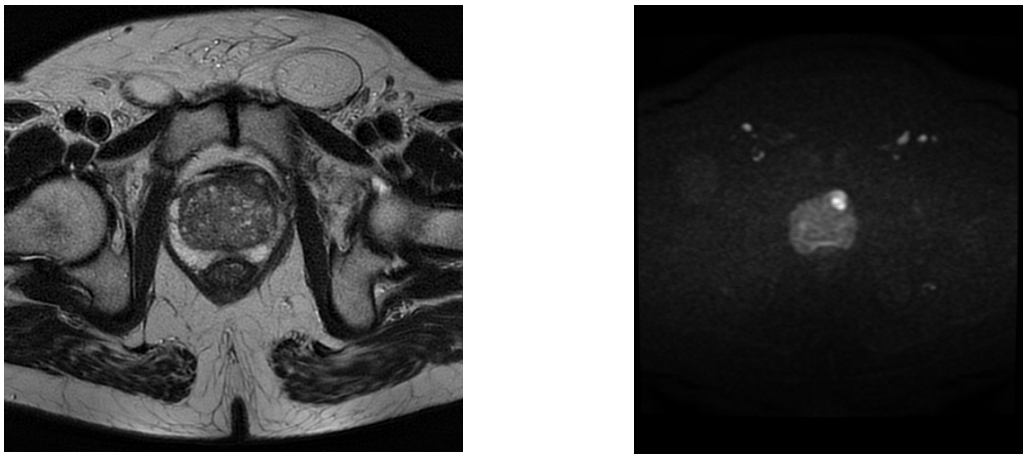


Figure 10,11: Axial T2W and axial DWI images showing PIRADS 4 lesion.

Thus, it is important to stay updated with the latest PIRADS classification and use it for further investigations to achieve an affirmative diagnosis and manage the condition more accurately.

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1. Allan S. Brett, Reviewing Kasivisvanathan V *et al*. Multiparametric MRI Might Optimize Evaluation of Men with Elevated Prostate-Specific Antigen Levels. New England Journal of Medicine. 2018.
2. Purysko A, Rosenkrantz A, Barentsz J, Weinreb J, Macura K. PI-RADS Version 2: A Pictorial Update. RadioGraphics. 2016;36(5):1354-1372.
3. The Radiology Assistant : Prostate Cancer - PI-RADS v2 [Internet]. Radiologyassistant.nl. 2019 [cited 18 June 2019]. Available from: http://www.radiologyassistant.nl/en/p59987056acbb4/prostate-cancer-pi-rads-v2.html



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**Dr Yash Patel**
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# Interesting Looking Photographs of 3D VR Images of CT Scan of a Child After Multiple Burr Hole Surgery Done as a Part of Treatment of Moya Moya Disease

**Dr Masum Shah** (MD)
**Dr Ronak Patel** (MD, DNB, FRCR)
**Dr Yash Patel** (MD)

Photo Assay

## Introduction

A 10 year old male patient presented with history of multiple stroke episodes and was diagnosed as having moya-moya disease by digital subtraction angiography (DSA) of brain.[1]

As a part of his treatment, he was operated by team of neurosurgeons in our hospital with bilateral multiple burr holes, dural and arachnoid opening over the frontal, parietal, and temporal regions of each hemisphere.[1] The elevated periosteal flap was placed in contact with the exposed brain through each burr hole. Aim was indirect revascularization of brain parenchyma.[2,3]

Post-operative CT scan of this patient was done before discharge which revealed signs of previous ischaemic events in brain. But interesting was 3D volume rendered (VR) images of skull vault of patient after surgery which revealed multiple burr holes in skull vault bones as if they were multiple pellet /bullet entry sites of gun shot injury!

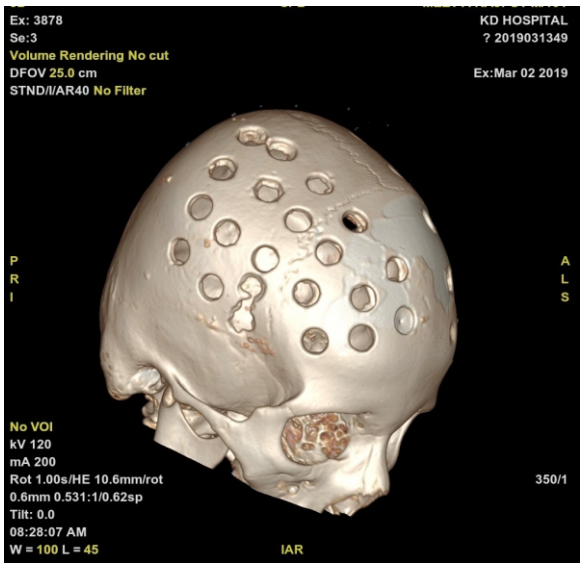


Figure 1: 3-Dimensional volume rendered (3D VR) image showing multiple burr holes on right side

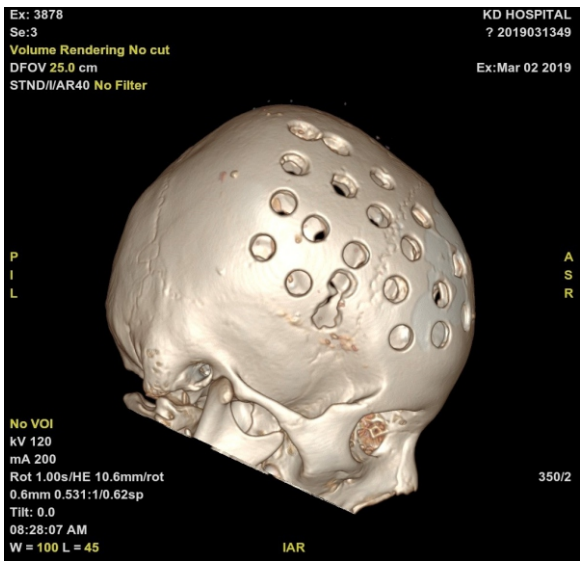


Figure 2: 3D VR image showing multiple burr holes on right side

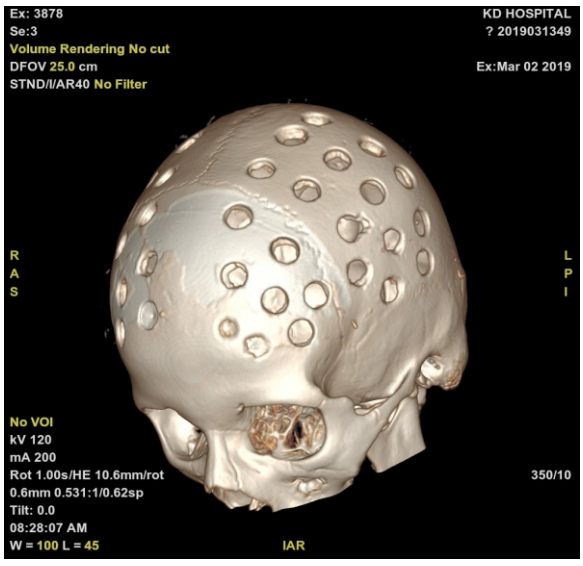


Figure 3: 3D VR image showing multiple burr holes on left side

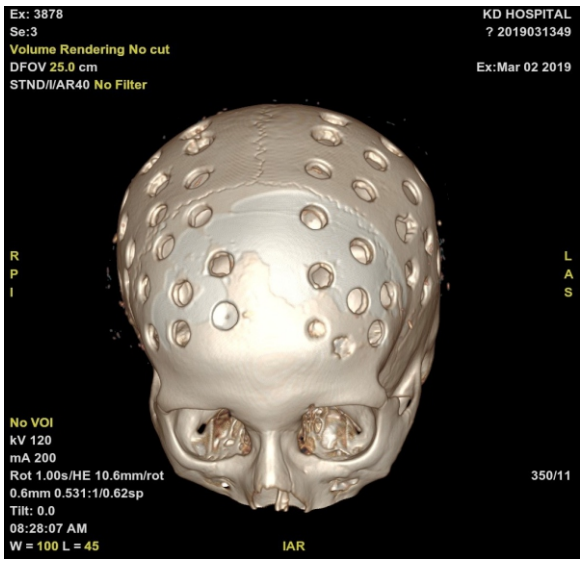


Figure 4: 3D VR image showing multiple burr holes bilaterally as seen from frontal view

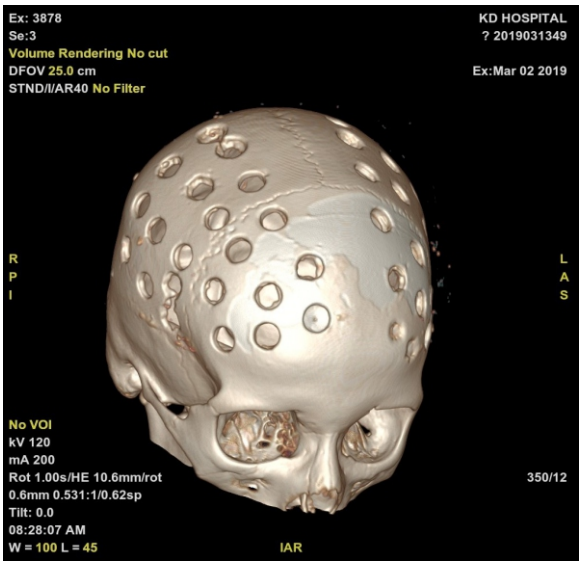


Figure 5: 3D VR image showing multiple burr holes bilaterally as seen from frontal view

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2. Houkin K, Nakayama N, Kuroda S, Ishikawa T, Nonaka T. How Does Angiogenesis Develop In Pediatric Moyamoya Disease After Surgery?. Child's Nervous System. 2003;-1(1):1-1.
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# CMEs 2018-19

## Ahmedabad Medical Association Conference (KD AMACON) 2019


## Prostate Cancer CME at KD Hospital by Dr Shrenik Shah



## Basic Course in Interventional Pain Management by Dr Rajiv Harshe



## Assisted Reproductive Technology (ART) Workshop by Dr Dipesh Sorathiya



## Bariatric CME at Gandhinagar by Dr Manish Khaitan



## Cardiac CME at Topaz Chandkheda by Dr Jayesh Rawal and Dr Krunal Tamakuwala



## CME with IMA Mehsana by Dr Sandip Modh and Dr Manish Khaitan




## CME with NIMA and AISM Group Doctors



## CME for Homeopathy Doctors by Dr Sandip Modh & Dr Hardik Yadav



## CME at Kadi by Dr Jigar Mehta & Dr Jay Patel



## Neonatal Haemodynamics CME at KD Hospital by Dr Snehal Patel



## CME at Balasinor by Dr Sandip Modh, Dr Gopal Shah, Dr Jigar Mehta, Dr Dhiren Raval



## CME at Chandkheda by Dr Jayesh Rawal & Dr Krunal Tamakuwala



# PATIENT SPEAKS

**Ms Urmila Trivedi**
(Adani Shantigram)

"We had a very nice and satisfying experience with KD hospital during the treatment of my mother. The doctors and supporting staff in the internal medicine department are very cooperative and everyone knows their job very perfectly making me feel great to have such hospital staff in Ahmedabad. We will suggest our friends and family to come and get your services whenever needed and seek God's blessings for your caring staff."

**Mr Kalpesh Agrawal**
(Baroda)

"My son got good treatment by the doctors in the Paediatric cardiosurgery department. He faced no problem during the treatment. We are highly satisfied by the staff, services, and food provided by the hospital."

**Ms Rita Patel**
(Baklol, Anand)

"All I have to say is that the hospital is second to none. The prompt services, courteous staff, and cleanliness at the bariatric services department here are applaudable."

**Mr Anil Vagrecha**
(Indore)

"I found the staff of KD Hospital in the general ward and in all other departments to be very caring. All the facilities in the neurosurgery department are very good and patient care is considered to be the utmost priority."

**Ms Dharmishtha H. Patel**
(Science City, Ahmedabad)

"I am heartily thankful for the minimal pain surgery, good service, and support given by the knee replacement surgeons and staff from the admission to discharge. We would opt for KD Hospital again, if need arises, and suggest the same to friends and relatives."

**Mr Barkatali Khatri**
(Bharuch)

"I underwent surgery for bilateral hernia at KD Hospital and am highly satisfied with the treatment and facilities provided by the hospital. Though I am a heart patient, the surgery was carried out successfully by the highly skilled and competent surgeons. The environment, staff, and infrastructure facilities in the hospital are very clean, hygienic, and excellent. I recommend this hospital to my relatives and friends also."

**Ms Pintuben G. Patel**
Bopal, Ahmedabad

"I am highly grateful to the hospital staff and especially the doctor in the Pulmonology department. In the very first appointment we got right advice and good, correct, and timely treatment was provided from the time of admission to discharge."

**Ms Beatrice K. Rwelengera**
(Tanzania)

"I received a very warm welcome from the friendly, nice, and caring staff at the Gynaecology department. The ward was very comfortable and clear and the food was delicious. The doctor and her team were excellent and made me feel safe. They performed the procedure very well, without any pain or discomfort. I will be grateful to the hospital forever and will recommend this hospital to others also."

**Mr Ambalal Patel**
(New Ranip, Ahmedabad)

"All the services provided in the plastic surgery department are very good. I really appreciate the great hospitality and good treatment I received. It feels just like home here."

**Mr Jasbir Singh**
(Vadodara)

"My daughter suffered from very serious complication but due to all the hard work of the doctors, nurses, staff, and other team members at the Paediatric NICU department, she is now normal. We are highly thankful to everyone here."

**Mr Mukeshkumar R. Soni**
(Sabarkantha)

"The hospitality, timely management of things by staff, and concern shown by the surgeons in gastrosurgery department is laudable. I heartily thank and wish that God's blessings be with them."

**Dr Chintan Sheth &**
**Dr Tejaswini Sheth**
(Adani Shantigram, Ahmedabad)

"The care and compassion exhibited by the doctors and staff during the Orthopaedic surgery of our father makes us deeply indebted to them. We are highly grateful for all the help and support."

**Mr Pradipbhai R. Patel**
(Uvarsad, Gandhinagar)

"I am impressed by all the services and staff in your hospital. The gastroenterologist and neurologist are really nice and provide very good treatment. The food as well as the catering services are also good. My condition was very critical when I was admitted but at discharge I am feeling healthy and energetic."

**Ms Sangita Patel**
(Naranpura, Ahmedabad)

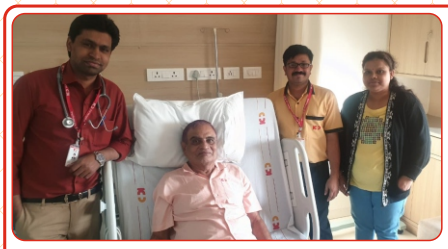
"We love the services of the orthopaedic department as all staff is very knowledgeable and cooperative, especially the dietician, PRO, and physiotherapists. The rooms are neat and clean and the attendant and housekeeping staff is also very nice and helpful. I would love to refer someone to this hospital in the future."

**Mr Suresh G. Barochiya**
(SP Ring Road, Ahmedabad)

"Thanks for being my saviour and providing excellent treatment at the cardiology department here. Apart from the excellent hospital management, good behaviour of doctors and nursing staff are its laudable assets."

**Mrs Binita C. Kankuwala**
(Vasna, Ahmedabad)

"First of all I would like to thank the management for providing a hospital with such great services. The entire staff is very warm and affectionate and ever ready to help the patient and relatives. The hospital in No. 1 in terms of cleanliness. The floor manager and doctor's team in the bariatric department are very supportive. All facilities are very good. Especially, the food facility in canteen is so good that one feels like coming to eat even if not a patient."



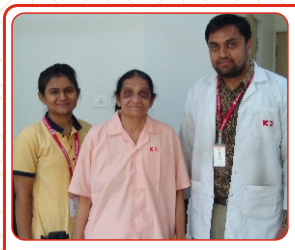
**Ms Sukanya Chakraborty** (Gota, Ahmedabad)

"We are really very happy with all the services, i.e., from doctors to helpers in the Cardiology department. All are very cooperative and always ready to help whenever needed which aided in fast recovery of our father. He is wearing his smile again after suffering from a heart attack and his long ordeal because of the proper medical aid provided under the able supervision here and the highly equipped ICU.

The hospital is sure to be a landmark medicare destination in the western part of our country as it continues to bring more smiles to people like us who visit here."

**Mr Rudrax D. Desai**
(Sabarkantha)

"I really appreciate the treatment provided in the gastroenterology department. The nursing staff is very good and the overall hospitality and services provided are admirable."



**Ms Sonal T. Marfatiya**
(Paldi)

"The staff and doctors in the Oncosurgery department are very cooperative. All the services and treatment provided here are excellent."

**Mr Dilip Rathod**
(SG Road, Ahmedabad)

"We are highly pleased and impressed by the services provided in the Urology department here. The staff is very polite and approachable. The nurses and PRO look after the patient with great sincerity. The doctor and his team is also very skilful, approachable, and polite. It is a memorable experience and we request the hospital to maintain the same quality of services in future also."

**Ms Kashmira B. Modh**
(Chandkheda, Ahmedabad)

"I am very happy with all the services provided by the entire staff and management. The hospital is very good as all facilities needed in the neurosurgery department are available in the hospital and very nice care is provided to the patient."

**Ms Vaishali Shah**
(Vasna, Ahmedabad)

"I would like to thank the staff and doctors in the orthopaedic department for providing such a wonderful experience to us. The staff is terrific and resourceful and is ready to serve at a moment's notice."

# Reader's Views

Dear Dr Anuja and Adit,

Thanks for your first issue of KD Abhigyaan (March 2019).
The issue was full of beautiful articles and case studies. My patients are also satisfied with KD Hospital treatment and charges. Please maintain same rapport in future also.
I also appreciate your live interaction with doctors through this bulletin.

Thank you,
Dr Govindbhai M. Patel
(Modasa)

Dear Madam,

Thanks for selecting & sending "ABHIGYAAN " magazine.
I am a Family Physician practising in Jamnagar since 50 years.
Through the magazine I came to know about your excellent hospital. I never knew such an institute exists.
I have gone through all the articles and found concerned doctors have performed best in the interest of the patients.
You have established a new way by giving photos of doctors who treated at the end of the article.
Feedback from patients is good but in some letters it is not mentioned for what they were admitted.
I am eagerly waiting for the next issue.

Wishing you best.

Sincerely ,
Dr Bipin A. Sanghvi
(Jamnagar)

Hello,

Thanks for sending issue : March, 2019 Abhigyaan.
I am practising as family physician at Dehgam since last 42 years.
I have read all the articles in detail and would like to thank you for providing state-of-art services to all classes of people.
I would be happy to visit your hospital on Sunday.

Thanking you,
Sincerely yours,
Dr C. F. Shah
(Dehgam)

# Oppressed by Obesity, Relieved by Bariatrics

Before

After

Weighed down with weight, not just on his knees and legs but also on his mind and confidence. A victim of culturally induced lifestyle, lack of knowledge, and genetic makeup. Shaivil Shah now stands as a victorious man in the battle he fought against obesity along with an army of armoured surgeons, dietician, and counsellors of KD Hospital. In a time span of 4 months he managed to shed 30 kg. He was 130 kg before he underwent the Bariatric procedure. Yes! 'Bariatric Procedure', not Bariatric Surgery, that's what Shaivil chooses to term it. The word surgery can be deceiving, his body wasn't cut, just pierced.

Prior to his transformation, Shaivil recalls his despair and depressed days. A stage in his life where he chose to keep quiet, even if he was filled with talks and opinions on the topic of conversation at hand. The time when he wanted to stand at the marketing and public relations desk but instead tricked himself to take care of the production. When he shunned social gatherings, adventure holidays and offered an excuse to avoid business trips. Not because, he had no zest for life or lacked any needed abilities, instead it was buried down and blanketed beneath the thick layer of fat that had deposited not just over his body's vital organs but also above his lively life and wishes. He knew he had to remove that baggage of weight, and he tried not once but several times. From diet to rigorous exercise, to yoga to any advice that was offered to him from every passerby. It helped him, but only to a certain extent and that too only for a while, later it failed and the weight returned, bringing along feelings of guilt, failure, and helplessness.

Shaivil may have failed in his attempts, but hope was still alive. Thus, when he read about the medical discovery of Bariatric procedure, he immediately began to gather information and collect reviews from all the patients who had undergone it. Even after being convinced about the safety of the method, he faced an inner dilemma. Doubts were arising from his inner conscience as he thought he was choosing a shortcut and easier way to shed weight. But the day he met Dr Khaitan, he got enlightened about the Bariatric Procedure and got to know sighting that it wasn't an easier way, for even post-surgery he was required to exercise, follow a healthy diet, and keep himself motivated throughout. The procedure is just a way of eliminating the path to indulge in overeating and unhealthy food.

In other words, it is a way to temporarily shut the options that lead to the consequence. After this acknowledgement, the very next day without any further procrastination he happily walked through the corridors of KD Hospital and got himself operated. It's been 4 months now, and every time he attends the counselling and awareness sessions, along with his spouse or family member, he appears more assured, healthier, and above all happier and confident than he was before the procedure. On being inquired whether he would advise this procedure to anyone? He instantly replies, "Sure! In fact, I do recommend the procedure to everyone who is suffering from obesity and leading a miserable life weighed down by unnecessary weight that affects the organs leading to diseases like high blood pressure, thyroid problems, and diabetes and also stopping them from living their life to the fullest."

Note : Published with consent of the patient

## SCOPE OF SERVICES

- Anaesthesiology
- Arthroscopy & Sports Medicine
- Audiometry
- Bariatric Surgery
- Blood Bank
- Cardiac Surgery
- Cardiology
- Clinical Nutrition
- Critical Care & Intensive Care
- Dentistry & Implantology
- Dermatology & Cosmetology
- Emergency Medicine
- E.N.T.
- Endocrinology & Diabetic Clinic
- Gastroenterology
- General Medicine
- General Surgery
- Gastro-Intestinal & Hepatobiliary Surgery
- Gynaecology & Obstetrics
- Immigrants Visa Health Checkup
- Infectious Diseases
- IVF & Birthing Centre
- Laboratory Medicine
- Medical Oncology & Chemotherapy
- Neonatology & Paediatrics
- Nephrology & Dialysis Centre
- Neurology & Stroke Centre
- Neurosurgery
- Ophthalmology
- Orthopaedics & Trauma
- Joint Replacement
- Pain Clinic
- Physiotherapy & Rehabilitation
- Plastic & Reconstructive Surgery
- Preventive Health Checkup
- Psychiatry
- Pulmonology
- Radiology
- Rheumatology
- Sleep Medicine
- Spine Surgery
- Surgical Oncology
- Trauma Care
- Urology
- Vascular & Thoracic Surgery

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