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Cochlear implantation in Waardenburg Syndrome: Case report and literature review

Video Assisted Thoracoscopic Surgery- State-of-the-Art Care at Jaypee Hospital

Budd Chiari Syndrome

Congenital Spinal Cord Deformity (Diastematomyelia Type I-split cord malformation)

Med Review is published by Jaypee Hospital, Noida for Medical Professionals.

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Cochlear implantation in Waardenburg Syndrome: Case report and literature review



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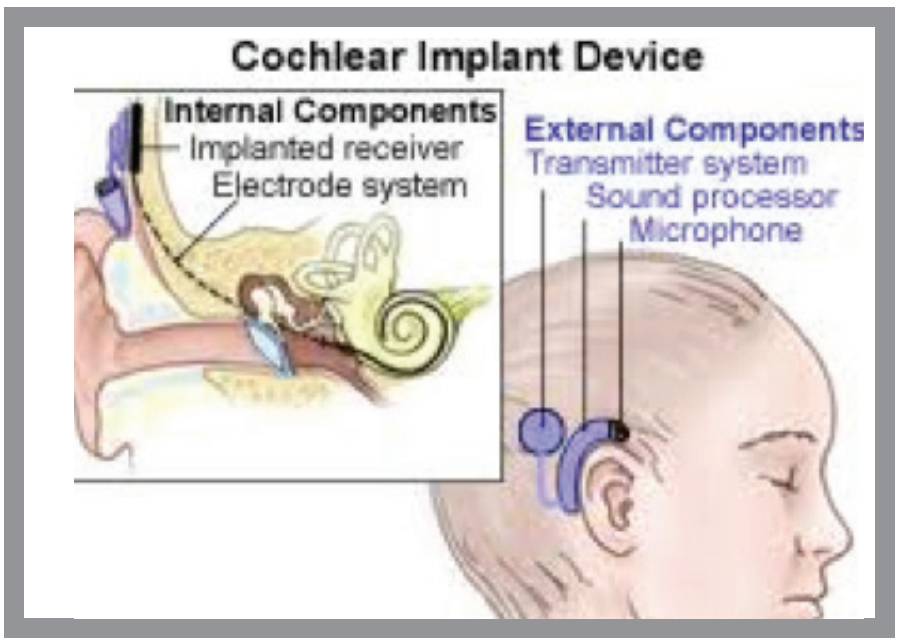
Abstract

Waardenburg syndrome (WS) is a childhood deafness syndrome with varying degrees of sensorineural hearing loss (SNHL). In cases of WS with profound SHNL, cochlear implantation is considered the standard of care. Below is our experience of cochlear implantation in a 3.5-year-old boy with WS. Unlike some cases of WS with inner ear abnormalities, this patient had normal inner ear anatomy. The subset of patients with WS with normal radiological study derives significant benefit from cochlear implantation.

Introduction

Waardenburg syndrome (WS) is a paediatric deafness syndrome with varying degrees of sensorineural hearing loss (SNHL). It is named after Petrus Johannes Waardenburg, who first described it in 1947. The prevalence of WS is estimated at approximately 1 case per 42,000 individuals. It is usually inherited in an autosomal-dominant manner except for some cases of WS Type II and WS Type IV, which may be inherited in an autosomal-recessive fashion. Apart from SHNL, other characteristic features include pigmentary changes in the form of depigmentation of hair (white forelock), white eyelashes; leukoderma and heterochromia or hypochromia iridis. Motor and social developmental delay have also been reported in some cases. In cases of WS with profound SHNL, cochlear implantation is considered the standard of care. We report our experience of cochlear implantation in apatient with WS.



Case report

The patient was a 3.5 year male with characteristic WS features – white forelock and heterochromia iridis. Detailed clinical history especially the birth history of the child was taken. The child had a normal perinatal history and had achieved motor and social milestones appropriate for his age. The mental and psychomotor assessment revealed normal intelligence and normal developmental quotient. On audiological examination (BERA and OAE), it was observed that the child had bilateral profound SNHL. Both high resolution computed tomography (HRCT) scans of the temporal bone and magnetic resonance imaging (MRI) of the head and inner ear with the 3D reconstruction of the cochlea constituted the radiological workup before implantation. Imaging studies revealed a normal anatomy of the inner ear.

A thorough hearing aid trial for 3 months was given with no significant benefit. After detailed counselling of the parents and of the child, cochlear implantation was performed on the left side. The implantation was carried out with

standard post-aural approach via cortical mastoidectomy, posterior tympanostomy and cochleostomy. There were no operative complications and the child had an uneventful postoperative period.

Discussion

WS can be classified into different types based on the genes affected and physical traits of the patients. The details of the classification of WS have been tabulated in Table I. WS can be classified into different types based on the genes affected and physical traits of the patients. The details of the classification of WS have been tabulated in Table I.

Imaging studies have revealed that, unlike our patient with normal radiological studies, some patients with WS can have inner ear malformations. Presence of an abnormal inner ear can create difficulties in the process of cochlear implantation.

Abnormalities of the bony construction of the inner ear, including cochlear and internal auditory canal hypoplasia, semicircular canal aplasia (especially posterior canal) have been reported in up to 17% of WS patients. Additionally, poorly developed vestibule and short, stubby semicircular canals have been described. It has been observed in a few studies that normal preoperative imaging studies in WS patients does not completely negate the risk of facing obstacles during implantation. However, other studies have reported good outcome after cochlear implantation in WS, similar to our case. Most of the patients with WS exhibit normal anatomy of the inner ear. We found in our case of WS that implantation did not differ from non-WS patients in terms of pre-implantation planning, imaging studies or audiological data.

Therefore, these patients derive significant benefit from cochlear implantation. This data may be useful in pre-implantation counselling of patients with WS and their caregivers. However, this information is obviously not applicable for WS patients with inner ear malformations.

Conclusion

Our report on cochlear implantation in WS patient indicates that children with WS exhibiting normal inner ear anatomy can undergo cochlear implantation and the implantation planning needed is comparable to those in non-WS patients.

Declaration of interest:

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

ENT

Type	Gene and Locus	Phenotype
Type I	PAX3; 2q35	Dystopia canthorum, changes in pigmentation (white forelock, heterochromia iridis, white eyelashes, leukoderma), Sensorineural hearing loss
Type IIA [2][3]	MITF; 3p14.1-p12	Similar to WS Type I without dystopia canthorum
Type IIB [2][3]	WS2B; 1p21-p13.3	Similar to WS Type IIA
Type IIC [2][3]	WS2C ; 8p23	Similar to WS Type IIA
Type III [4] (Klein-Waardenburg syndrome)	PAX3; 2q35	Similar to WS Type I phenotype plus upper limb abnormalities
Type IV [5] (Shah-Waardenburg syndrome)	EDNRB; 22q13 EDN3 ; 20q13.2-q13.3 SOX10; 22q13	Similar to WS Type I phenotype plus Hirschsprung disease

Congenital spinal cord deformity (Diastematomyelia Type 1-split cord malformation).



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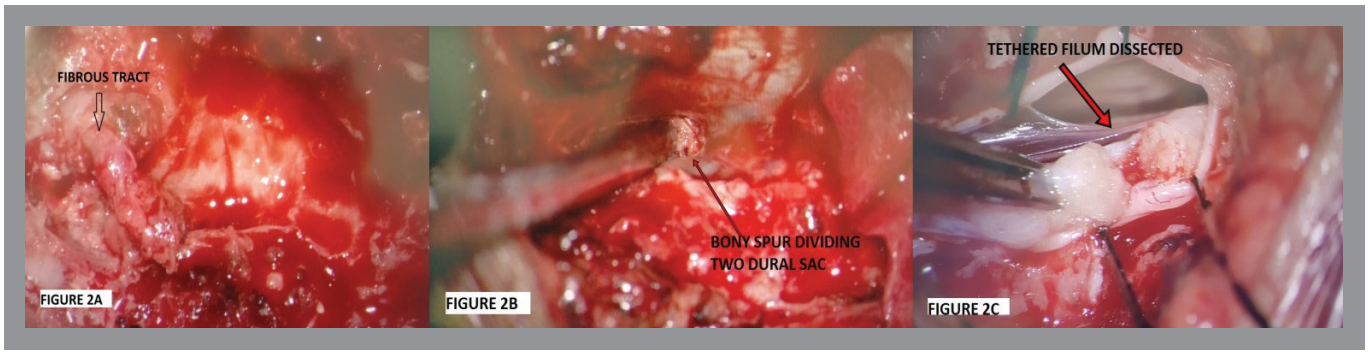
Case report:

A four-year-old child presented with the presence of a midline pale looking patch at the mid back with a small opening since birth. There was on and off discharge from this opening for 20 days. She was conscious, oriented and had no neurological deficits. The patch was present at the dorsolumbar junction on the back. It was pale pink in colour and had a small opening about 3 mm but no discharge was evident. MRI of dorsolumbar spine was done which was suggestive of a bony spur at the D12 level associated with the bifid butterfly D12 vertebra (Figure 1A). The bony spur was dividing the spinal cord into two halves with a separate dural sac of each half (Figure 1B). The proximal cord had syringomyelia (Figure 1C). The spinal cord was low lying and the filum terminale was tethered at the L5-S1 junction (Figure 1D). The patient was taken for the excision of bony spur and repair of spinal dysraphism (Diastematomyelia type 1) and de-tethering of cord, under general anaesthesia in a prone position. The fibrous tract was communicating from the extradural space till D12 (Figure 2A). The track was excised and dura was repaired. The bony spur was extradural at the D12 level and was dividing the spinal cord into two halves (Figure 2B). The spur was drilled and removed. The dura was repaired into one sac. Filum terminale was thickened and adherent below S1 which was cut and the cord was de-tethered (Figure 2C). The child gradually improved after the surgery and she was discharged in a stable state. The child is able to walk nicely and has no bladder or bowel abnormalities in follow up.

Discussion:

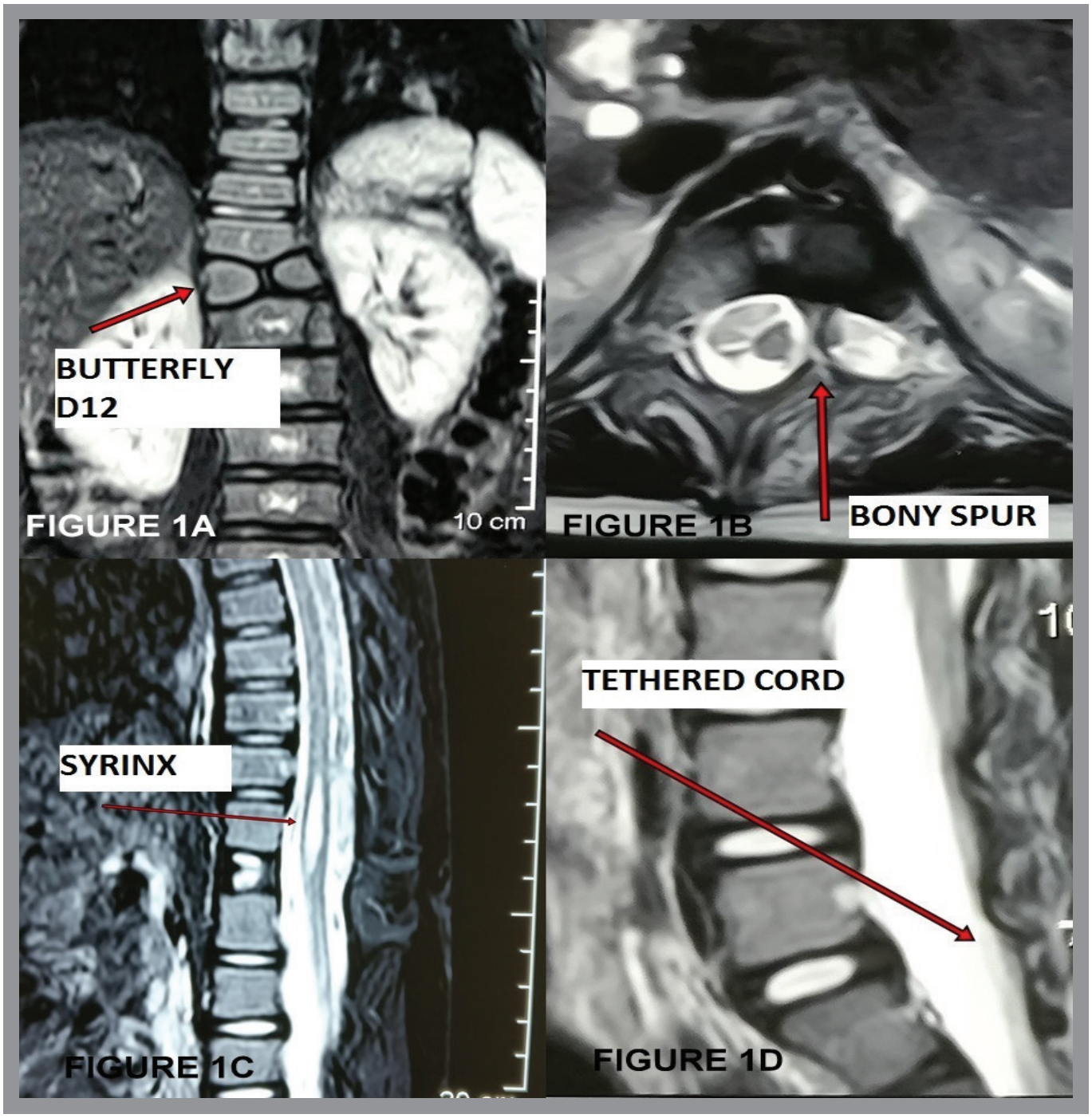
Diastematomyelia (diastomyelia) is a congenital spinal disorder and one of the variants of neural tube defect (NTD). NTD (spinal dysraphism) occurs in about 1-3 children in 1000 live births. Diastematomyelia occurs in about 5% of all the cases of spinal dysraphism and is also known as split cord malformation. Females are affected more commonly than males. This condition has an osseous, cartilaginous or fibrous septum in the central portion of the spinal canal. Thus the spinal cord is completely or incompletely sagittally divided into two hemicords. Sometimes the cord doesn't unite after the septum resulting in true duplication of the spinal cord (diplomyelia). Split cord malformations are of two types according to the presence of a dividing septum and single vs dual dural sac. Type I has duplicated dural sac, with common midline spur and usually symptomatic whereas Type II has single dural sac containing both hemicords and impairment is less marked. 50% of the split cord malformation occur between L1-3 level and about 25% occur between D7-D12 level and uncommonly at other levels.

The symptoms of diastematomyelia may appear at any time of life, although the diagnosis is usually made in childhood. Overlying cutaneous lesions (or stigmata), such as a hairy patch, dimple, hemangioma, subcutaneous mass, lipoma or teratoma is found in more than half of the cases. Neurological symptoms are nonspecific and caused due to cord tethering by tissue attachments. These attachments limit the movement of the



spinal cord within the spinal column and stretch the spinal cord. The course of the disorder is progressive. In children, symptoms may include cutaneous stigmata and/or foot and spinal deformities; weakness in the legs; low back pain; scoliosis; and incontinence. In adults, the signs and symptoms often include progressive sensory and motor problems and loss of bowel and bladder control. Cerebrospinal fluid flow may also be blocked leading to syringomyelia which can lead to additional loss of movement, feeling or the onset of pain or autonomic symptoms.

X rays can detect bony malformations and dysplasias but MRI scanning is often the first choice of screening and diagnosis. MRIs generally give detailed assessment of the spinal cord deformities. However, it has some limitations in highlighting the detailed bone anatomy. Combined myelographic and post-myelographic CT scan is an effective tool for demonstrating the detailed bony anatomy (intradural and extradural) of the affected vertebra and the bony spur. Prenatal ultrasound diagnosis of this anomaly is usually possible in the early to mid third-trimester. Prenatal ultrasound could also detect whether the diastematomyelia is isolated or associated with any serious neural tube defects. Surgical intervention is the main treatment. It is indicated in patients who present with new-onset of neurological signs and symptoms or have a history of progressive neurological manifestations which can be related to this abnormality. The surgical procedure includes decompression (surgery) of neural elements and removal of the bony spur. This may be accomplished with or without resection and repair of the duplicated dural sacs. Resection and repair of the duplicated dural sacs are preferred since the dural abnormality also partly contributes to the symptoms. The patient may need rehabilitation after surgery for desired improvement.



Video Assisted Thoracoscopic Surgery- State of the Art Care at Jaypee Hospital



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Video Assisted Thoracoscopic Surgery -State-of-the-Art Care at Jaypee Hospital

One of the most dreaded scenarios for any surgeon is that of respiratory complications after a major surgery. The risk of the same increases many folds after thoracic surgery. Tradiationally thoracic surgery has been done by rib spreading thoracotomy incisions. In traditionally thoracotomy a long incision is made and the ribs are spread using a rib spreader (Image-1). After the surgery the ribs are again approximated and the chest wall is closed. The issue in such a surgery is that of severe pain every time the patient tries to breath. The pain continues well into the post operative period and the recovery is usually prolonged. The inadequate chest expansion due to pain leads to delayed recovery and respiratory complications such as atelectesis and pneumonia. Even after a successful recovery, the patient may suffer from chronic pain syndromes.

Video Assisted Thoracoscopic Surgery (VATS)

It is the application of principles of minimal access surgery to thoracic surgery in which the surgery is done through small keyhole incisions. The obvious advantages are lesser pain, faster recovery and decrease in morbidity. (Image 2) The surgery and the extent remains the same however the surgery is done through smaller incision(s). There have been various definitions of VATS, however the basic principles remain the same-There should not be any rib spreading with smaller incision and the surgery should be performed looking in the monitor. However till date there is no standard definition of VATS and many thoracic surgeons continue to use large incisions with rib spreading in their VATS resections; such practices preclude many of the advantages of the VATS approach.

VATS at Jaypee Hospital

VATS is a team effort and requires good coordination between the pulmonolist, surgeon and the critical care team. The surgery is technically challenging and requires expertise. However equally important is the pre and post-operative management. The surgery is done using special instruments designed for VATS using high definition scopes (Karl Storz). The surgery is done using a very small incision and post-operative recovery is faster as compared to open surgery.(Image 3) The common procedure for which VATS surgery is being done at Jaypee hospital are-

• Lung Cancer — VATS is being used frequently to assist in the diagnosis, staging, and treatment of lung cancer. Lobectomies and segmentectomies are performed using small incisions along with mediastinal lymph node dissection.

• Emphysema — For lung volume reduction surgeries

• Interstitial Lung Disease — Multiple lung biopsies

• Myasthenia Gravis — Thymectomy can be done through small incisions

• Spontaneous pneumothorax, broncho pleural fistuals and pleurodesis - VATS can be used for identifying the site of air leak and sealing it using staplers. Pleurodesis is done for malignant pleural effusion

• Biopsy from the mediastinal lymph nodes, pleural biopsy etc.

Case Example: VATS Left Upper Lobectomy - Single port

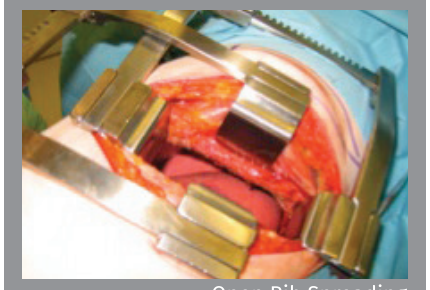
A 53 year old lady presented with 4x3cm lesion in the left upper lobe of the lung that was evaluated. She was a smoker and biopsy from the lesion confirmed it to carcinoma (Adenocarcinoma), PET CT did not reveal any metastasis. Endo bronchial ultarsonography (EBUS) was done and did not reveal any significant lymph node. She was advised Left upper Lobectomy.

A single port VATS left upper lobectomy was done. The lung was removed through a single incision that was 4.5cm long. No rib spreading was done. The total blood loss during surgery was around 150ml and she made an uneventful post-operative recovery. She was ambulated and shifted to ward on POD 1 and started on solid diet. The ICD was removed after 72 hours and she was discharged on POD 4. (Image 2)

Discussion

The advantages VATS surgery offers in terms of post operative recovery for decreased morbidity are beyond doubt for more than any other form of minimal invasive surgery. The unique advantage of having the best infrastructure and a good team effort has lead to the development of a successful VATS programme that strives to achieve greater heights in days to come. We are now not only offering the best Video Assisted surgery but also have achieved the technical superiority of doing single port VATS that is offered at very few centres across the world. The surgery and the subsequent recovery from it, is very important in case of oncology as the subsequent adjuvant treatment depends on good surgery.


VATS Incision


Open Rib Spreading Thorocotomy incision

Ruptured Aneurysmal Subarachnoid haemorrhage (Anterior Communicating Artery and Internal Carotid Artery Aneurysm).

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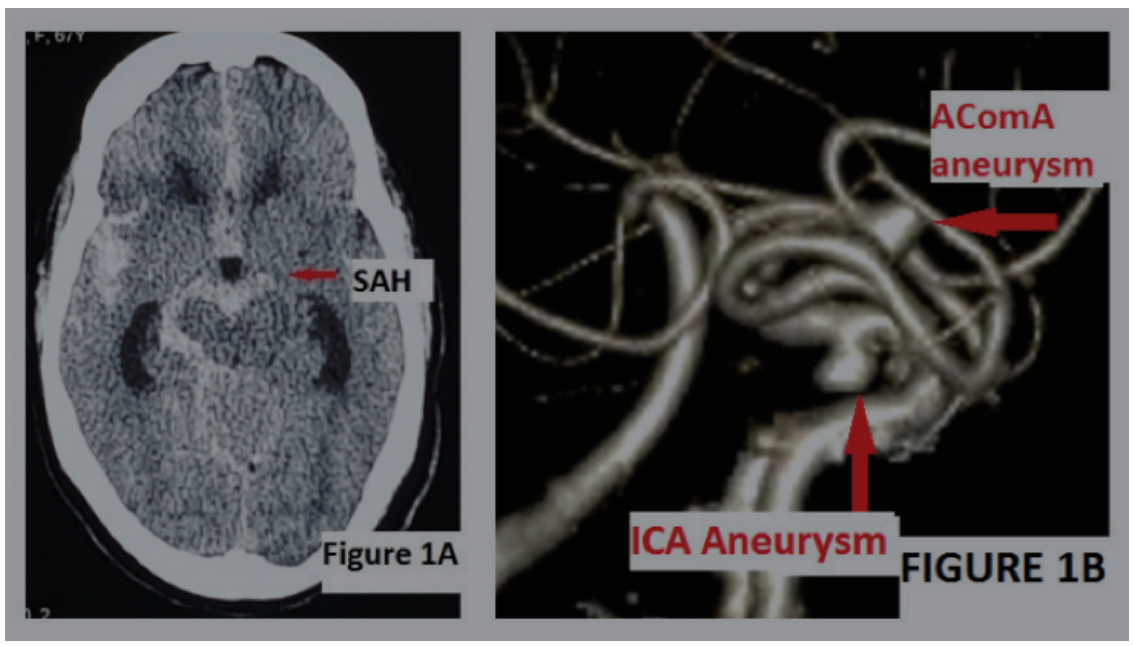
Case Report:

A 67-yr-old lady presented to a local hospital with complaints of multiple episodes of vomiting followed by loss of consciousness. CT Brain was done which revealed the presence of blood in basal cisterns with parieto-occipital SAH (Figure 1A). She was referred to Jaypee Hospital for further management. At the time of admission, she was drowsy but arousable and not obeying commands. Her GCS was E3V4M5 and pupils were 1.5mm bilaterally reactive to light. CT cerebral angiography was done, which revealed a saccular aneurysm measuring ~ 5mm with 2.7 mm neck arising from an ophthalmic segment of the left internal carotid artery (ICA) (Figure 1B). Another lobulated saccular aneurysm measuring 6.1 mm was seen arising from the anterior communicating artery (AComA) (Figure 1B). After obtaining informed consent the patient underwent craniotomy and clipping of both the aneurysms under general anaesthesia. The AComA aneurysm was ruptured and it was multilobulated with left A1 dominance and



atretic right A2 (Figure 2). The External ventricular drainage was also put in the left frontal horn. The wall of the ICA was friable and atherosclerosis (Figure 2). No intraoperative rupture of the aneurysm was encountered. However, intermittent temporary clipping was applied. The patient tolerated the procedure well and was shifted to ICU. Post-operatively patient gradually improved and CT cerebral angiography was done which revealed residual left hypophyseal/clinoidal aneurysm of size 5.4 x 4.6 mm approx with adjacent aneurysm clip at the apex. AComA aneurysm was well clipped and no obvious residual aneurysm was seen. Moderate spasm was seen in left A1 ACA & B/L A2 ACA. The patient had clinical vasospasm and decreased limb movements on the sixth post-operative day and after obtaining an informed consent the patient was taken for an intra-arterial nimodipine instillation in bilateral ICA along with balloon-assisted coiling of residual ICA aneurysm by Neurointervention team (Figure 3). The patient tolerated the procedure well and improved but she clinically deteriorated after closing EVD even after 15 days of ictus. So the EVD was converted to permanent medium pressure ventriculoperitoneal shunt, following which she got better and was discharged in a conscious state with no neurological deficit.

Discussion:

Aneurysmal subarachnoid haemorrhage is a devastating disease and about 10% people die before reaching the hospital. Overall, three-months mortality is 50%. A saccular aneurysm constitutes about 90% of all types of aneurysms and majority (85%-90%) occur in the anterior circulation of circle of willis. The common presentation of an aneurysm is subarachnoid haemorrhage, which usually starts with sudden severe headache followed by vomiting and unconsciousness. Patients may also present with seizures, neurological deficit, meningeal irritation, visual symptoms, hormonal imbalance and epistaxis. The anterior communicating artery aneurysm is the most common site of rupture followed by the middle cerebral artery and the internal carotid artery. The diagnosis is usually made on CT scan and to ascertain the site of aneurysm CT cerebral angiography (CTA) is sufficient in most of the cases. Sometimes digital subtraction angiography (DSA) may be needed if CTA is inconclusive. The treatment is based on the site, type of aneurysm and choice of the patient. The present patient had initially been treated with the craniotomy and clipping considering the multilobulated pattern and wide neck of the aneurysm. The patient needed aggressive post-operative management and the medical treatment is equally important. The treatment involves maintaining euvolemia and induced hypertension. The concept of triple H (hypertension, hemodilution and hypervolemia) is not mandatory. The major complications occur due to vasospasm, CSF flow obstruction, infection, other pre-existing morbid diseases, electrolyte imbalance and iatrogenic causes. The present patient had a cerebrovascular spasm and it was managed by endovascular treatment. The patient also developed hydrocephalus and it needed CSF diversion in form of VP shunting. The overall outcome of this disease depends on various factors and among them; timely arrival to the hospital with proper facility seems to be the most important contributing factor.

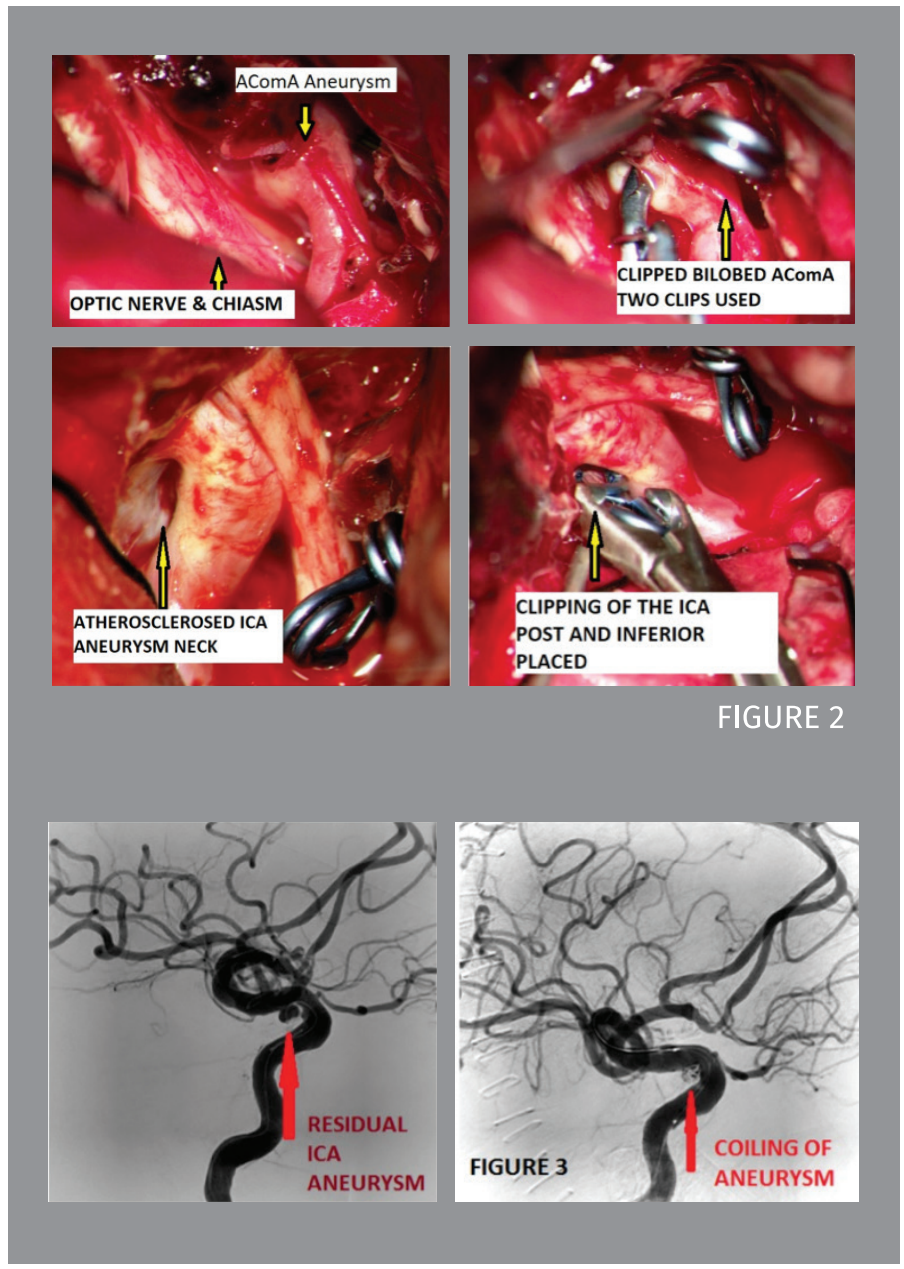


FIGURE 2

FIGURE 3

Commando surgery without facial scar: Is it feasible?

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Abstract

Commando procedure is used for oral cavity cancer removal. Wide local excision of a tumour along with mandibulectomy and neck dissection is known as the commando procedure. In this procedure, the lower cheek flap is raised and the anterior split is made over the lip region. But we used posterior split technique i.e. tragal incision to raise the flap and hence good cosmetic and functional outcome in terms of no drooling. The tumour was also removed completely. And the postoperative period was uneventful.

Case Presentation

A 45 year old male patient came to us with the chief complaints of ulcer in the oral cavity for the past two months. It was sudden to start with, not associated with any pain. On examination, an ulceroproliferative growth was found in the right-retromolar trigone region involving upper and lower last molars. The mouth opening was reduced. Imaging done in the form of PET-CT showed localized disease and no distant metastasis. Preanaesthetic checkup and a medical review were done and a wide local excision of a tumour with upper and lower alveolectomy was done along with modified neck dissection type II using posterior split technique and reconstruction done in the form of a radial artery free flap. Postoperative period was uneventful.

Introduction

Carcinoma of oral cavity comprises 30% of all malignant tumour of head and neck. 90% of these are squamous cell carcinoma while the remaining 10% represent rare malignancy (an unusual variant of squamous cell carcinoma, adenosquamous carcinoma, verrucous carcinoma, lymphoepithelioma, carcinosarcoma, minor salivary gland tumor, lymphoma etc.). Common risk factors for all oral malignancy are tobacco and alcohol. Both tobacco and alcohol have a synergistic effect. Chewing betel nuts, areca nuts, ill-fitting dentures, spicy food and HPV infections remains the other major causes of oral cancer. Poor dental hygiene and chronic mechanical irritation by any means have been associated with the development of cancer. Although genetic factors contribute to the development of cancer, some environmental factors also cause cancer.

Over the past 30 years, there has been an explosion of knowledge of the different aspects of oral cancer. Nevertheless, despite these developments, the 5-year survival of this disease has advanced a little. Although the quality of life has undoubtedly improved. For diagnosis, a complete history and physical examination is a must. Direct laryngoscopy and biopsy remain the gold standard for diagnosis and to rule out synchronous lesion in the oral cavity. Once a definitive diagnosis is made, imaging is required to determine the stage of the patient. CT scan helps us to know the extent of a tumour, mandibular involvement, surrounding soft tissue involvement and muscle involvement. It also tells us about the lymph node involvement and distant metastasis in the chest. If there is a concern about soft tissue involvement, MRI is better as compared to CT scan. PET scan may be combined with CT scan to know distant metastasis.

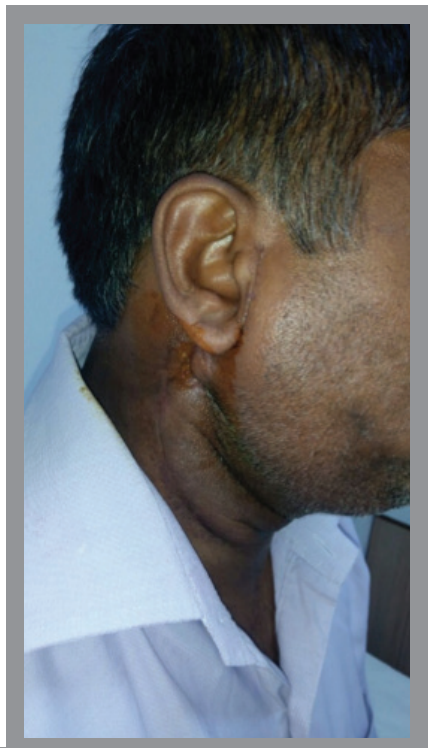
The majority of carcinomas involving the oral cavity need multimodality treatment. Single modality treatment is used for early-stage cancer. Stoppage of smoking is must during the treatment course. Dental care is a very important aspect of treatment. Multimodality treatment involves surgery, chemotherapy and radiotherapy. The goal of surgery is to achieve a complete resection of tumour all around with negative margins and hence give complete cure and goal of radiotherapy and chemotherapy is to prevent recurrence.

In surgery of oral cavity, commando procedure is done. Commando is a combination of mandibulectomy and neck dissection operations. In this procedure, wide local excision of a tumour is done with minimum 1cm margins all around and mandibulectomy in the form of marginal, segmental, classical or distal along with modified neck dissections. The resultant defect is closed with either pectoralis major

myocutaneous flap or radial artery free fasciocutaneous flap or free fibular flap if mandible is involved. Traditionally in commando, lower cheek flap is raised and the anterior split is given in the oral cavity. This anterior split is given on the lips which give adequate exposure to the oral cavity but cosmetically give very bad scars to the anterior aspect of the face which leaves an ugly looking scar in the postoperative period. Unequal appearance of face along with lip damage leads to drooling of saliva from the mouth. Difficulty in swallowing this saliva is further increased after radiotherapy and hence there is a functional deformity. Sometimes collection of saliva in the oral cavity leads to secondary infections in the oral cavity.

In our patient we used posterior split technique, in which we used parotid incision or tragal incision and lower cheek flap is raised. From the posterior side, we raised the flap and hence the tumour was removed from the posterior aspect. From the posterior aspect, RMT clearance along with marginal mandibulectomy and upper alveolectomy is done. The neck dissections pattern were changed from radical to modified neck dissections and multiple variations in the neck incisions occurred with the passage of time. In our patient, we completed modified neck dissections type II and the resultant defect was closed with radial artery fasciocutaneous free flap based on radial artery. The advantage of this type of flap is that it has a very long pedicle and thin and very pliable skin, which can be used for the closure of the defect in the oral cavity.

The advantage of the posterior split technique is that no lip splitting is required for such incision. The tumour is removed intraorally as well as from the posterior side and no drooling of saliva occurs from the mouth and hence there are no associated secondary infections or bad smell. Good functional outcome comes in the form of good speech, no saliva drooling and good aesthetic outcome in the form of no scar anteriorly. This gives the patient less psychological trauma and a better post-operative life.



Budd Chiari Syndrome



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RADIOLOGY

Introduction

Budd-Chiari Syndrome (BCS) is a congestive hepatopathy caused by blockage of hepatic veins. This syndrome occurs in 1/1,00,000 in the general population. The hypercoagulable state can be identified in 75% of the patients; more than one etiologic factor may play a role in 25% of the patients.

BCS is considered primary or secondary depending on the origin of the obstructive lesion. If the obstruction is the result of endoluminal venous lesion-like thrombosis, primary BCS is considered. In secondary BCS, the cause originates from neighbouring structures like extrinsic compression or tumour invasion.

This 9-year-old child presented to us with symptoms of congestive Hepatomegaly and ascites.

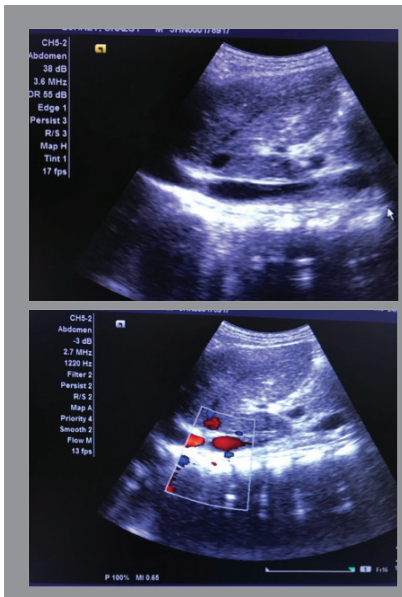
On USG it was found that the patient had a narrowing at the ostium of the junction of the middle hepatic vein (MHV) and left hepatic vein (LHV). Both were draining via a collateral to the right hepatic vein (RHV) with short segment fibrotic occlusion of the suprahepatic IVC leading to the obliterative hepatocavopathy.

Case Report

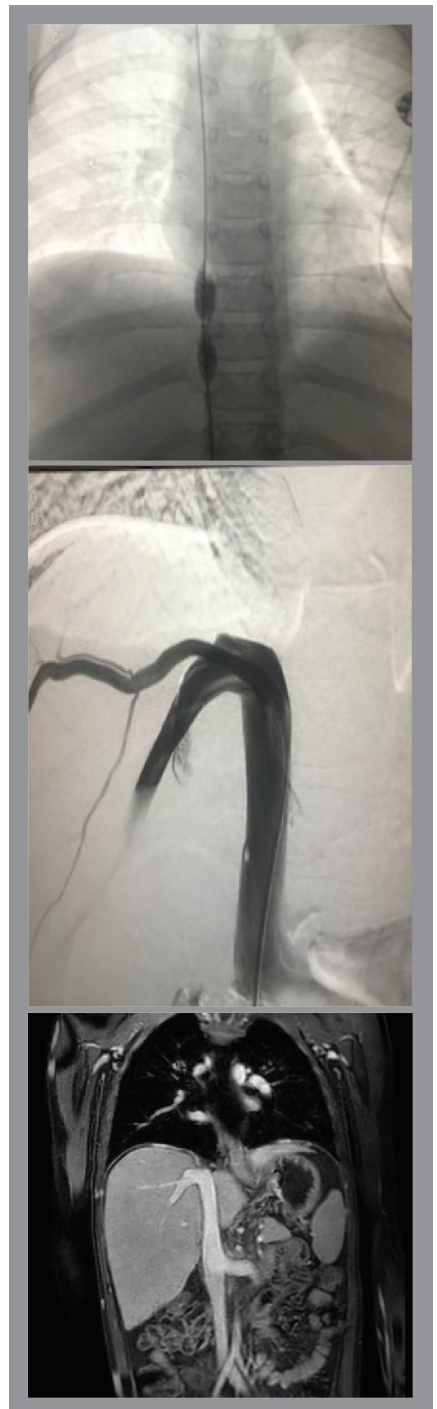
Under sedation, the fibrotic occlusion was recanalized and serial angioplasty was done. Even after angioplasty, the pressure gradient in the RHV and IVC were found to be high and hence stenting was done across the occluded segment.

What was challenging in this particular case was the recanalization because of the short segment of total fibrotic occlusion and suprahepatic location. We thought of making a blind needle puncture across the occlusion, but there was good chance that we might make a bridge outside the lumen and then there was the chance of blood leakage because of suprahepatic location, which is a relatively bare area. Putting a covered stent graft was an option but then occlusion segment was very close to the ostium of the RHV and that was the only vein which was draining the liver. So we stuck to the recanalization across the total fibrotic occlusion.

We never thought of opening the rest of the hepatic veins as a normal single hepatic vein is sufficient for hepatic drainage and pressure gradient was significantly reduced in RHV after stenting.



USG



MR Venography and Cavography shows occluded suprahepatic IVC.

Conclusion

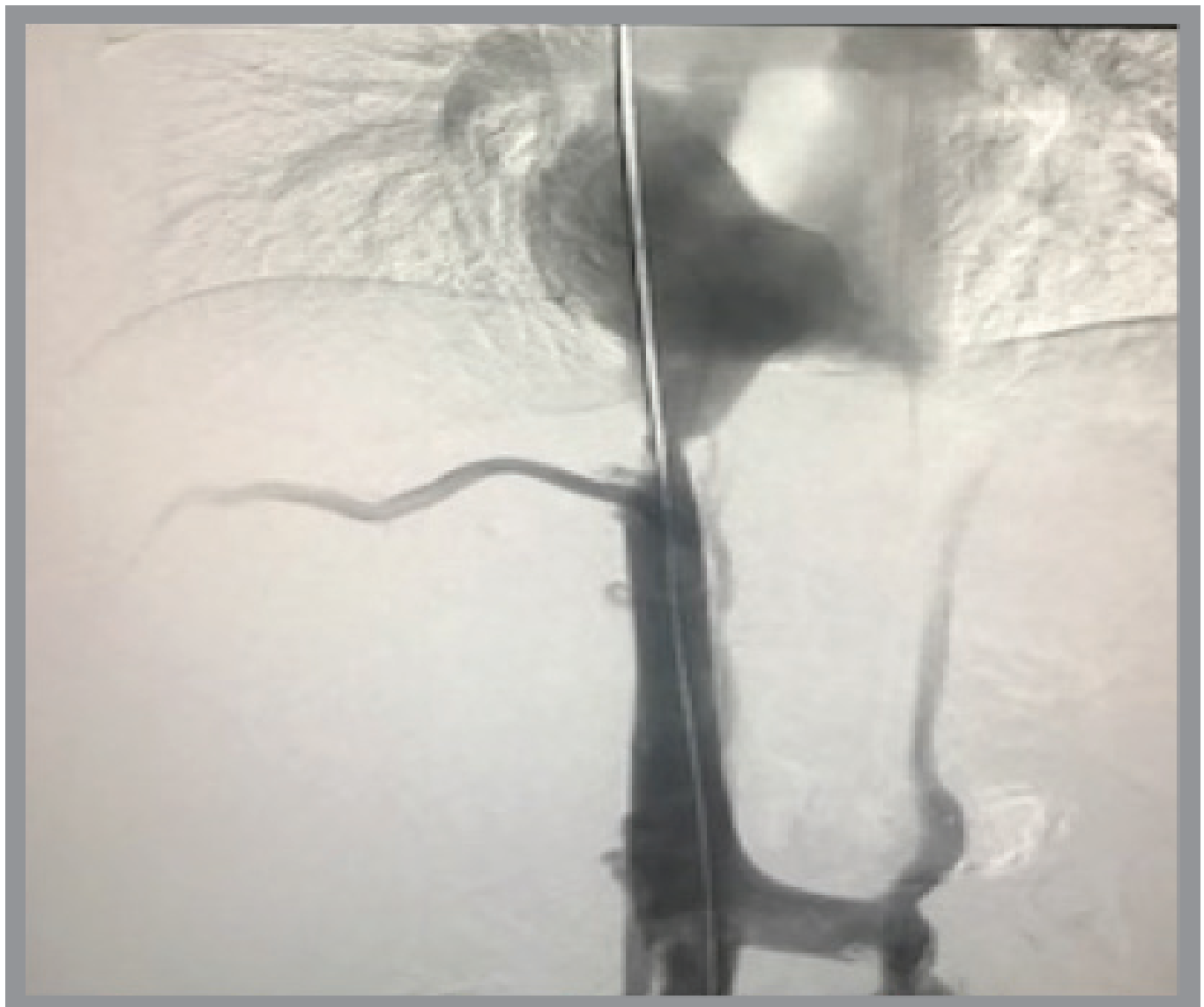
BCS should be suspected in patients with: (1) Abrupt onset of ascites and painful hepatomegaly; (2) Massive ascites with relatively preserved liver functions; (3) Sinusoidal dilation in liver biopsy without heart disease; (4) Fulminant hepatic failure associated with hepatomegaly and ascites; (5) Unexplained chronic liver disease; (6) Liver disease with thrombogenic disorder.

Serum transferase levels may be more than five times the upper limit of the normal range, especially in the fulminant and acute forms of BCS. Serum alkaline phosphatase and bilirubin levels also increase. Serum albumin level decreases moderately.

Doppler ultrasonography of the liver, with a sensitivity and specificity of 85% or more is the technique of choice for initial investigation when BCS is suspected. Imaging of hepatic veins without flow signal, and with spider-web appearance, collateral hepatic venous circulation and stagnant, reversed or turbulent flow are indicative of BCS. Unvisualized or tortuous hepatic veins are common but non-specific sonographic findings of BCS, as they may be observed in advanced cirrhosis caused by other etiologies. Intrahepatic or subcapsular venous collaterals are sensitive sonographic findings of the disease, present in up to 80% of cases.

Magnetic resonance imaging (MRI) should be performed as a second-line imaging modality. MRI can show the hepatic vein thrombosis and evaluate the IVC. Unvisualized hepatic veins are suggestive of disease on CT, but false-positive or indeterminable results can occur in 50% of cases.

Hepatic venography is the reference procedure for the evaluation of hepatic veins, the extent of thrombosis and caval pressures. Inferior cavography should be performed to demonstrate stenosis or occlusion of the IVC. It should be considered when percutaneous or surgical shunts are planned.
Endovascular treatment is the treatment of choice nowadays.



Recanalization with cavoplasty and stenting of the occluded segment.

Our endeavour towards quality (October to December 2017)

Jaypee Hospital is committed to quality care and safety of patients. We continuously look for ways to improve care, decrease errors and strive to exceed patient's expectations. The safety of our patients is our top priority and is embraced by the entire organization. We coordinate with all departments to promote the goal of improved medical care and patient satisfaction.

With the increase in OPD footfall to 481 patients per day (average), OPD patient satisfaction for the last quarter (July-Sept) has been 98%. Similarly, the IPD bed occupancy has increased to 63%: the average length of stay has reduced to three days with In-Patient Satisfaction Index at 76%. The Patient Welfare Team at Jaypee Hospital diligently collects feedback from OPD, IPD and day care patients. The Patient Satisfaction Index and patient feedback are monitored regularly on weekly basis by the top management. Feedback is shared with respective department coordinators every week and the trends are displayed in the Hospital Operations meeting held every Tuesday.

Our Team at the Emergency Department plays a key role in patient care services and tries to minimize the time taken for initial assessment of patients reporting to the department and the average TAT for initial assessment being six minutes.

Assessment of dietary needs is a part of medical care plan at Jaypee Hospital. The aim is to provide a nutritionally balanced diet to every patient. Our dedicated team of dieticians actively assess the nutrition needs of 99% of patients within 24 hours of admission.

In order to achieve a high level of organizational standards; the organization monitors and discusses the trends of various organization indicators in the Quality Steering Committee meeting and Department Review meetings

At Jaypee Hospital; care for our employees and provide regular training to the healthcare workers on various occupational hazards including training on infection control practices and safe handling of sharps. The needlestick injury rate in OPD and IPD has been 0.07 and 0.72 respectively, which is below the defined benchmark of the hospital. Similarly, the incidence of body fluid exposure has been 0 and 0.06 in OPD and IPD respectively.

At Jaypee Hospital understand the importance of medical records in the continuity of patient care. Our missing medical record percentage stands at 0%.

International Patient Safety Goals

1. **Improve accuracy of patient's identification**
   - Patient Name
   - UHID
2. **Improve effective communication**
   - Ensure verbal order policy is followed
   - Ensure proper patient handover
3. **Improve the safety of high alert medications**
   - Ensure Medication Management Policy is followed
4. **Ensure the correct site, procedure and patient surgery**
   - Follow time-out before all surgeries & invasive procedures
5. **Reduce risk of health-care associated infections**
   - Follow 5 moments of hand-hygiene
   - Perform 6 steps of hand-hygiene
6. **Reduce risk of patient harm resulting from falls**
   - Ensure fall prevention protocols are followed

JAYPEE HOSPITAL
LIFE FIRST

AWARDS & ACCOLADES

THE BEST MULTI SPECIALTY HOSPITAL IN DELHI-NCR

at the Times Health Achievers Awards 2017

Ranked amongst the
TOP 10 HOSPITALS
in North India by Times Health
All India Critical Care Hospital
Ranking Survey 2017

EMERGING BRAND OF THE YEAR 2016
by India Health & Wellness Awards 2016

BEST EMERGING HOSPITAL
by TOI Best Hospital Survery, 2016

NABH ACCREDITED

GOLD LEED CERTIFIED

JAYPEE HOSPITAL
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CENTRES OF EXCELLENCE

- Institute Of Heart
- Institute Of Oncology
- Institute Of Organ Transplant
- Institute Of Orthopaedics And Spine
- Institute Of Minimally Invasive Surgery
- Institute Of Gastrointestinal And Hepatobiliary Sciences
- Institute Of Neurosciences
- Institute Of Renal Diseases
- Institute Of Aesthetic And Reconstructive Surgery
- Institute Of Mother And Child
- Department of Haematology and Bone Marrow Transplant
- Department of Emergency and Trauma
- Department of Critical Care and Anaesthesiology
- Department of Respiratory and Critical Care Medicine
- Department of Endocrinology and Diabetes
- Department of Infertility and IVF
- Department of Internal Medicine
- Department of Rheumatology
- Department of Ophthalmology
- Department of ENT
- Department of Radiology
- Department of Laboratory Medicine
- Department of Transfusion Medicine
- Department of Nuclear Medicine
- Department of Sports Medicine & Rehabilitation
- Department of Dental Surgery
- Department of Behavioural Sciences

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