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Editor : Manoj Saha

A Tribute to

Late Dr. H K. Borah

It's my great privilege to write this tribute for a great surgeon and esteemed teacher Dr. Hiranya Kumar Borah sir, doyen of paediatric surgery in north east India, passed away on July 7, 2021 at the age of 76. He was founder head of the department of paediatric surgery at Gauhati Medical College and hospital. Born at Woodmari near Samaguri in Nagaon, he was educated in Shillong , passed M.B.B.S from AMC, Dibrugarh and later completed his MCh degree from PGIMER, Chandigarh in 1981.

First time I came to know and see Borah sir in 1985 while we were third year medical student. We were posted in general surgery OT as observer. We got to know that one small baby would be operated for a tumour in his abdomen. That was the first time I heard the term Wilms tumour. One and the only paediatric surgeon Dr H. K. Borah sir would be operating. We were all eager to see him as well the surgery. We were all standing on the outskirt; Borah sir wrapped the baby by cotton wool. He brought one I.V. cannula which was made in some foreign country. It was not like the one we use now; it was quite slender and long. Sir tried to insert it but it was unsuccessful once, finally he established the i.v. line. Senior anaesthesiologist anesthetized the baby with reasonable struggle. Sir opened the abdomen. We saw the massive tumour inside the abdomen of the tiny baby. That time there was no diathermy, sir put a series of artery forceps around the tumour and released one by one after tying. It was quite cumbersome and patient job. Our time was over, we left OT.

An astute teacher, sir used to take our theory classes; he would always share his experience of his meeting with great paediatric surgeons around the World. He was awarded the prestigious commonwealth fellowship and was a WOFAPS (World Federation of Association of Paediatric Surgeons) fellow and underwent observer fellowship in USA. Which allowed him to visit countries like the US, UK, Austria and Canada.

After my internship I joined in the vacant post of house surgeon in paediatric surgery for a short period of time. That time I saw how enthusiastic sir was. He was a busy practitioner also but somehow managed time to come and operate emergency cases. He was like one man army of the department. In that brief period of time I saw and learned cleft lip operation from him. How meticulously he used to perform! Even once sir repaired cleft lip of father of a child patient.

Sir used to do medical autopsy of some unusual cases. May be sir was the only person, I know, who used to do this. Once he split open a head to confirm choanal atresia. He was innovative, very particular in record keeping. Though he was a paediatric surgeon, he was very closely associated with Paediatrician's associations, and he was Chairman of Assam chapter of ASI in 2009.He was president of Guwahati chapter of IAP for two consecutive terms in 2008 and 2009.He was executive member of IAPS in 1988-89.

He had publications in JIAPS, Indian Pediatrics, JASA and others. He used to attend almost all related conferences. Sir imprinted exemplary zeal for learning, he attended PCNL workshop, live demonstration of robotic surgery and master classed in oncology even at past seventy years of age. Moreover, sir used to contribute articles to various magazines, and newspapers on topics of science and social issues also.

Sir was very stylish, very good in English and a sportsman. He participated in car race with his original model Maruti 800 car. Sir used to say, 'doctor's hand writing must be good; if you can't have control over your pen, how you can have control over your knife!'

I am blessed to have sir's foot step 3 times in my house. First time, sir visited my house in the year 2012 for the preconference dinned of NE chapter of IAPS. That time my house was new. He liked and admired my small and simple house very much. He took few pictures of both indoor and campus with his camera (sir always used to carry). In between sir visited my house once again while sir was returning in my car along with Dr Rupnayan from Bongaigaon after attending ASACON. Before returning we visited Bhutan (Galephu) together.

Finally, sir visited my house in the year 2020 during covid pandemic when lockdown was partially relaxed. I was and till now editor of JASA (sir was the founder editor of this flagship journal). Sir wrote an article on doyen of surgery of Assam late Prof J. Mahanta sir for publication in JASA. For the write up sir collected some information from Madam Mrs Mahanta. Sir made it a point to collect a copy of the said issue of JASA and to offer it to Madam (Mrs Mahanta). I salute sir's commitment. Sir came to my house particularly to collect a copy. Though I offered to deliver the copy to sir at his convenient place, sir wanted to come to my home to collect it. And that was the last time I met sir in life. Ultimately I met sir's mortal remains in Navagraha crematorium. Om shanti.

Dr Manoj Saha

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CONTENTS

Editorial

Covid 19 pandemic and surgical training

Coronavirus disease (COVID-19) has caused global disruption to health care. Non-urgent elective surgical cases have been cancelled, outpatient clinics were reduced and there had been a reduction in the number of patients presenting as an emergency. These factors have drastically affected the training opportunities of surgical trainees.

A systematic review [1] was performed in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The searches identified 499 articles, 29 of which were included in the review. Their study contained data from more than 20 countries; thirteen of the studies were from the United States, 6 were from European countries, 1 from South America, 1 from Pakistan and 1 from India, and 7 included data from multiple countries. Twenty- six of the studies were surveys including 5 national surveys across 8 surgical specialties, with 5260 trainees and 339 programme directors.

According to all of the studies, operative experience has been reduced. Knowledge learning had been switched to online platforms across 17 of the studies and 7 reported trainees had increased time to devote to educational/academic activities. All of the studies reporting on mental health reported negative associations with increased stress, ranging from 54.9% to 91.6% of trainees. The survey responses by trainees across different specialities and countries reflect a negative impact of COVID-19 on surgical training.

The results section was divided into themes arising from the studies: operative impact, non-operative impact, redeployment, educational/academic impact and personal impact.

Operative impact: There was a significant decrease in the total number of operative cases performed by trainees ($p = 0.033$). It was noted that this particularly affected 'medium-complexity' operations which would generally be performed by the trainees as first operator. To minimise operative time and the risk of COVID-19 transmission intra-operatively, senior surgeons were performing more of the emergency cases and training opportunities were further reduced.

Fifty- eight percent of orthopaedic trainees across 23 European countries were concerned about meeting annual training requirements [2].Similarly, 60% of urology program directors in the United States were concerned that trainees would not meet minimum case requirements due to the pandemic [3]

Redeployment rates were variable across studies, ranging from 46% [4] to 6% [3]. Redeployment was defined as providing non-surgical care to patients or being transferred to a non-surgical specialty. The highest rate was reported by Kapila et al, with 46% of Belgian plastic surgery trainees providing non-specialty support to patients with COVID-19 [4].

Educational/academic: Due to the decrease in clinical activity, the time for educational and academic pursuits increased. Across countries and specialities, the majority of studies reported there was a move towards online educational tools. The proportion of those reporting a change

to online education ranged from 86% to 98.5%.

Wellbeing: Thirty-three percent of 1102 general surgery trainees reported increased burnout compared to before the pandemic. There was negative impact on their interpersonal relationships and increased worries regarding finances. Trainees were concerned about the health of their loved ones or transmitting the virus to them [4].

But amidst some positives could be found. The rapid adaptation of educational resources to delivery through online platforms had allowed trainees to continue to develop their theoretical knowledge. Similarly, the conversion of conferences to webinar format enables a greater number of surgeons to access educational material remotely and reduced the need for study leave, costs associated with travel and accommodation [5]. Redeployment to an appropriately supervised area allowed acquisition of new skills and the refreshing of old [6a]

In another study by Hassan et al [7] 1102 general surgery residents completed the survey. The survey aimed to assess changes to surgical residents' clinical schedules, operative volume, and educational curricula as a result of the COVID-19 pandemic. Additionally, the impact of COVID-19 on resident burnout was also addressed.

Residents reported a significant decline in the number of cases performed during the pandemic. Educational curricula were largely shifted toward online didactics. The majority of residents reported spending more time on educational didactics than before the pandemic. The majority of residents feared contracting COVID-19 or transmitting it to their family during the pandemic

COVID-19 had adversely affected all surgical trainees globally and across all specialities. Negative effects were not limited to operative and clinical experience, but also the mental health and wellbeing of trainees. To quantify the true impact of COVID-19 and to make recommendations for the future provision of training, further studies using operative case volume and assessment data are required. Co-existing with COVID-19 surgical training needs to move away from traditional models of learning to ensure that trainees are competent and well supported.

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Manoj Saha

Editor

Original Article

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Biliary Drainage in Open Choledocholithotomy : A Comparative Study.

ABSTRACT

Introduction: Gallstone disease comprises of a spectrum of presentations . A sizeable numbers of patients with gall stone diseases present with Common Bile Duct calculi. Common Bile Duct calculi can be extracted through open or Lap exploration. The CBD is drained post operatively either internally or externally for optimum results. This study was to compare the surgical management and their outcomes in cases of Common Bile Duct exploration which were drained either externally (T-Tube Drainage) or internally (Choledochoduodenostomy) after extraction of the calculi.Materials & Methods: The study included 60 patients with choledocholithiasis who underwent procedures of either internal (Biliary-enteric anastomosis) or external (T-Tube) drainage of the common bile duct after its exploration for removal calculi.Results: There were comparable result on both the procedures of external and internal drainage of the CBD following choledochotomy. 24patients (80%) undergoing external drainage of CBD had an operative time upto 120 minutes while 6(20%) patients had an operative time of >150 minutes. In the internal drainage group 21(70%) patients had operative time of more than 150mins while seven patients (23.3%) had operative time of more than180minswith technical complicity.The duration of surgery was found to be longer in internal drainage($p<0.0001$).

Conclusions: The study showed comparable outcome in terms of post-operative complications and duration of hospital stay both in internal drainage or external drainage procedures. The internal biliary drainage was found to be technically difficult with longer duration of surgery.

Key word: CBD stones, internal- external drainage

Gallstone disease comprises of a spectrum of presentations where calculi are present anywhere within the biliary tree. About 11 % patients of cholelithiasis may have associated Common Bile Duct calculi1,2 . Common Bile Duct calculi can be extracted either via Laparoscopic Cholecystectomy with Laparoscopic CBD exploration (LCBDE) or via ERCP with sphincterotomy followed by laparoscopic cholecystectomy or via open surgical bile duct exploration. Open surgical interventions either follow primary closure, T-Tube drainage or Biliary enteric anastomosis procedures. But drainage of CBD following exploration is essential for optimum results.

This study was undertaken to compare the drainage techniques of CBD either internally (choledochoduodenostomy) or externally (T-Tube drainage) following extraction of CBD calculi, in terms of technical complicity, time taken during surgery, per & post-operative complications, and hospital stay.

MATERIALS AND METHODS

The present study was carried out on the patients admitted in the Department of General Surgery, in a teaching Hospital, Guwahati with the diagnosis of choledocholithiasis.

This clinical prospective study included 60 patients who underwent open procedure of choledocholothotomyfor calculous disease followed by internal or external drainage of CBDin a period one year.

Data has been collected and documented in a predesigned proforma that includes identification, history, clinical examination findings, diagnostic investigations and operative procedures. The postoperative outcomes and complications, hospital stay, morbidity and mortality with follow up data were documented. Adult patients undergoing internal or external drainage following CBD exploration for calculi were included in the study. Patients with bleeding disorder, cardiac disorder,and cholangitis were excluded.The 60 patients of choledocholithiasis were randomly selected into two groups of 30 each. One group underwent external (T-Tube) drainage of the common bile duct while the other group underwent internal drainage with Choledochoduodenostomy. Institutional Ethics committee approved the study proposal.

All the patients were first investigated for the different blood and biochemicalparameters. Coagulation profile, RFT, LFT,nutrition status, anaemia and the serum Albumin levels were optimized.

A Kehr's T tube of 12Fr was inserted into the CBD. T tube is fixed by using 3-0 absorbable suture and brought out of the abdomen through a separate stab wound. Postoperatively, the T – tube is allowed to drain freely into a sterile closed drainage bag. A T-tube cholangiogram is obtained on tenth day after surgery, and if found clear, the T-tube was removed. In the present study, Choledochoduodenostomy was done in 30 patients for multiple calculi with dilated CBD, impacted stone in duodenal papilla. All these patients had a CBD diameter >15mm. The results were observed in terms of Technical complicity, time taken during surgery, per &post operative complications, length of hospital stay.

Data analysis: In the present study data was analyzed by using instat graphed version 3.1. P value was calculated using Chi squared test and Fischer exact test. In the present study p value <0.1 was considered significant.

RESULTS AND OBSERVATION

The study included 60 patients who underwent open procedure of choledocholothotomy followed by internal or external drainage of CBD.The results were observed in terms of technical complicity, time taken during surgery, per & post-operative complications, length of hospital stay. The highest incidence of disease was found to be in the 31-40 years age group. The mean age of both the groupwas 45.42 ± 13.12 years. In the present study, there were 42 female patients and 18 male patients. The incidence of female patients with choledocholithiasis is 70% while that of male patients is 30%. Transabdominal ultrasonography showed 57(95%) patients to have GB sludge or calculi and the rest 3(5%) patients were having post cholecystectomy status. 27(45%) of the patients had dilated Intrahepaticbiliary radicles and all the 60(100%) patients had dilated common bile duct.A maximum number of 24(40%) patients had a CBD diameter between 13 to 16 mm while 10(16.7%) patients had marked dilatation (above 20mm) of the CBD. 24 (80%) patients undergoing external drainage of CBD had an intraoperative time upto 120 minutes or less while 6(20%) patients had an intraoperative time of >150 minutes. On the other hand, all 30 (100%) patients undergoing internal drainage of the CBD had an intraoperative time of more than 150 minutes. Chi squared test showed a p value of 0.0001 and is extremely significant **(Table 1).**

Operating Time (in Mins.)	External Drainage	Internal Drainage	P value
90 to 120	24	0	0.0001
121 to 150	6	2	
151 to 180	0	21	
181 to 210	0	7	
Total	30	30	

Table 1: Operating Time

4(13.3%) patients undergoing External drainage had a post operative complication of bile leak as compared to 6(20%) patients with Internal drainage of CBD post calculi extraction. Chi squared test provided a p value of 0.718 and is not significant. 4(13.3%) patients undergoing external drainage had a post operative complication of Surgical site infection as compared to 8 (26.7%) patients with internal drainage. Chi squared test provided a p value of 0.1967 and is not significant. 2(6.7%) patients undergoing External Drainage had a post operative complication of Cholangitis as compared to 3 (10%) patients with Internal Drainage of CBD post calculi extraction. Chi squared test provided a p value of 0.640 and is not significant (table 2).

Complications	External Drainage n=30	Internal Drainage n=30	Total Cases N=60	P Value
Bile Leak	4(13.3%)	6(20%)	10(16.7%)	0.718
Surgical Site Infection	4(13.3%)	8(26.7%)	12(20%)	0.1967
Cholangitis	2(6.7%)	3(10%)	5(8.3%)	0.1967

Table 2: Complications associated with the respective procedures.

The duration of Hospital stay for the different procedures does not show any significant difference. 27(90%) patients with external drainage and 24(80%) patients with internal drainage were discharged within 11 days (Mean is 8.48 ± 2.87 days) of Surgery. Chi squared test showed a p value of 0.2781 and is not significant. The average period of Hospital stay post operatively in the present study was 8.48 ± 2.87 days with a range from a minimum period of 4 days to a maximum period of 18days (Table 3).

Hospital Stay (In Days)	External Drainage	Internal Drainage	Total(N=60)
5 to 7	14(46.7%)	14(46.7%)	28
8 to 10	10(33.3%)	9(30%)	19
11 to 13	5(16.7%)	4(13.3%)	9
14 to 16	1(3.3%)	2(6.7%)	3
17 to 19	0	1(3.3%)	1
Total	30	30	60

Table 3: Duration of hospital stay

DISCUSSION

With the advent of Endoscopy/ ERCP and Laparoscopy, open surgical intervention for CBD exploration has come down. However in places where the infrastructure&expertise for Endoscopy or Laparoscopic interventions not available, open surgical interventions was the only option. Moreover, in certain subset of patients like the elderly, patients with cardiac or pulmonary comorbidities or in those in whom Endoscopy or Laproscopy was not possible. Open surgical procedures were a simple, adequate and effective alternatives with the standard practice of Internal or external drainage of CBD following exploration..

This study was aimedto compare the techniques of CBD drainage either external(T-Tube Drainage) or internal (Choledochoduodenostomy) following Choledocholithotomy.

In the present study the mean age of presentation of patients with Choledocholithiasis was 45.42 ± 13.12 years. The study included patients in the age range between 18 years to 82 years. Similar studies on common bile duct drainage following calculi extraction done at different periods of time3,4,5,6 . In the present study, Choledocholithiasis was found to be more prevalent in females, where out of total 60 patients , 42 were female and 18 were male with a gender ratio of 2.33 : 1,5,6,7,8..In the present study, 10(16.7%) out of the total 60 cases had post operative Bile leak, of which 4(13.3%) were in External drainage group while 6(20%) were in Internal drainage group.Chi squared test provided a p value of 0.718 and is not significant7,9,10. In the present study post operative surgical site infection was seen in 12(20%) out of the total 60 cases, of which 4(13.3%) were in the External drainage group while 8(26.7%) were in the Internal drainage group. Chi squared test provided a p value of 0.1967 and is not significant9,11,12,13.In the present study, Cholangitis was seen in 5(8.3%) out of the total 60 cases, of which 2(6.7%) were in the External drainage group while 3(10%) were in the Internal drainage group of CBD exploration for calculus. Here Chi squared test provided a p value of 0.640 and is not significant9,10 .

The various surgical complications in the two procedures of internal and external drainage of the common bile duct showed no significant difference greater. All the rate of complications were not significant with p value greater than 0.1(p>0.1) in each case14,15,16.

In the present study, the average time taken for surgery was 148.5±42.92 minutes. This was in contrast to external drainage procedure where the mean operative time was 115.17± 11.51minutes. Also the mean operative time for internal drainage procedure was 181.83± 36.46 minutes. The difference in operating time is significant with p value of 0.001.13,17,18,.

The average period of hospital stay in case of external drainage is 8.48± 2.87 days with a range from a minimum period of 4 days to a maximum period of 18 days. In case of Internal Drainage the average period of stay was 8.83±3.16 days. The variation among duration of average hospital stay is not statistically significant9,,11,18,19,

CONCLUSION

The external and internal drainage post choledochotomyhad comparable outcome in terms of post-operative complications and duration of hospital stay.There was technical complicity in the operative procedure of internaldrainage leading to long duration of surgery.The drawback of the study was that it did not include the procedure of Lap. Exploration of CBD with internal stenting.

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Original Article

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Severe Infected Acute Necrotizing Pancreatitis Can Be Cured By Partial Pancreatectomy with Splectomy: An Observation

ABSTRACT:

BACKGROUND: Pancreatectomy for severe acute necrotising pancreatitis has been associated with more mortality and hence replaced by piecemeal debridement and toileting either by the open or the laparoscopic technique. We had reported the results of deliberate subtotal pancreatectomy with splenectomy for infected pancreatic necrosis in acute pancreatitis. METHOD: Eighteen patients were studied for 6 years, out of which 9 patients were male. Average age was 61 years (36-69 years). The median time for operation after presentation was 27 days (Range 2-74). Microbiological culture confirmed infection in 14 (78%) patients. Most patients required ICU care. Prognosis is monitored not only by Ranson's, but also by APACHE, Glasgow and application of Balthazar score. RESULTS: Three patients (17%) died within 30 days of operation. Twelve of the 15 survivors (80%) underwent a single operative procedure. Three patients required a further laparotomy, of whom 2 required colectomy for ischaemia. Median hospital and ICU stays were 43 (Range 30-57) and 5 (Range 4-6) days respectively. Six patients (40% of survivors) developed an infection of the left half of the chevron incision; however, all wounds were fully healed within 3 months. Long-term follow-up of survivors (n=14) revealed 8 (57%) to need at least occasional pancreatic enzyme supplementation and 5 (36%) to have diabetes mellitus. Two patients (14%) developed an incisional hernia. CONCLUSIONS: About 20% of acute pancreatitis presented with severe necrotising pancreatitis, where more than 50% is the mortality. Timely laparotomy and distal pancreatectomy with removal of spleen and necrosectomy along with irrigation is the noble option to reduce mortality and morbidity. Considering much fatality of the pathogenesis, and prolonged ICU care and associated high cost of treatment the patients need to be covered under national health scheme. Mass health insurance coverage in the need of the hour.

KEYWORDS: Acute Severe Pancreatitis; Necrotising; Radical; Splenectomy; Subtotal Pancreatectomy.

The incidence of acute pancreatitis appears to have responsible for most deaths during the early phase.[1] The overall mortality rate for acute pancreatitis remains about 10%,[2,3] the majority of deaths (80%) occurring in patients with pancreatic necrosis.[4] Multiple Organ System Failure (MOSF) is responsible for most deaths during the early phase of the disease process[5] with secondary pancreatic sepsis accounting for later mortality.[6] Pancreatic resection, either partial or complete, was used in the management of severe acute pancreatitis for many years,[7,8] but the practice stopped owing to a high incidence of complications and associated mortality.[9,10] It is basically two types; mild oedematous and severe necrotising. Mild variety gets controlled by watch and observes with palliative measure, but severe necrotising variety needs surgical intervention at appropriate time to reduce mortality from its life-threatening complications and multiple organ failure syndrome. Aldridge and Colleagues in 1985, demonstrated that timely excision of necrotic pancreatic tissue may help reduce the high mortality associated with this condition. Radical distal pancreatic resection aided by deliberate splenectomy to be an

effective approach in infected pancreatic necrosis and is the treatment of choice[11] followed by continuous irrigation.

MATERIALS AND METHODS:

During the study period of 6 years, 18 patients (9 males) with severe acute pancreatitis underwent radical pancreatic resection. The median age was 61 years (Range 36-69). During the period from January 2014 to January 2020, prospective data were collected on all those patients who underwent operation for severe necrotising pancreatitis. This included details of age, sex, operative findings and procedure, Acute Physiology and Chronic Health Evaluation (APACHE II) score 12, duration of Intensive Care Unit (ICU) stay, total duration of hospital stay, postoperative complications, microbiological data and histology. Follow-up data were available for every patient for at least 3 years. The median time for operation after presentation was 27 days (range 2-74). Microbiological culture confirmed infection in 14 (78%) patients. One patient (6%) died within 30 days of operation. Twelve of the 17 survivors (71%) underwent a single operative procedure. Three patients required a further laparotomy, of whom 2 required colectomy for ischaemia. Median hospital and ICU stays were 43 (Range 30-57) and 5 (Range 4-6) days respectively. Six patients (35% of survivors) developed an infection of the left half of the chevron incision; however, all wounds were fully healed within 3 months. Longterm follow-up of survivors revealed 8 (47%) to need at least occasional pancreatic enzyme supplementation and 5 (29%) to have diabetes mellitus. One patient (6%) developed an incisional hernia.10 Patients who had cholelithiasis underwent cholecystectomy. Indication for Pancreatic Resection - During the 6-year period of study, an early "baseline" contrast CT was performed in every case. Patients were supported with oxygen, intravenous fluids, enteral and/or parenteral nutrition and antibiotics and careful observation was made for any clinical/biochemical deterioration that might represent super infection. If the patient became septic as evidenced by pyrexia and a rise in inflammatory markers including CRP and rising APACHE II score 12, then in the absence of any other cause (e.g., chest, urine or line infection) it was assumed that pancreatic infection was present. CT was repeated and would normally confirm identical or progressive pancreatic necrosis (patchy or total). The primary reason for repeating CT was to identify a separate fluid collection/potential abscess that was amenable to percutaneous drainage using a radiologically guided pigtail catheter. Operative intervention was considered in those patients who were not amenable to such percutaneous intervention. Fine needle aspiration for microbiology of solid necrosis was not routinely performed and our practice was that of careful and sensitive observation, operating on patients is thought to have developed infection of pancreatic necrosis, but before they had decompensated, become profoundly septic or developed multi-organ failure. We found that a sudden rise in the inflammatory marker, C-Reactive Protein (CRP) was particularly useful in the regard. In summary, this series represented a consecutive group of patients either admitted directly under the senior consultant surgeon or referred to him with complicated acute pancreatitis who having initially responded to conservative management of their pancreatic necrosis, subsequently developed signs of sepsis with CT evidence of a disorganised semi-solid mass within the pancreatic bed, sometimes containing gas and not amenable to percutaneous drainage. Operative Technique With the patient under general anaesthetic, the abdomen was opened using a chevron/rooftop (Bilateral subcostal with vertical extension) incision. The typical findings were as follows - the greater curvature of the stomach and the splenic flexure of the colon were matted down over the region of the pancreatic tail and spleen, often with a large pancreatic/peripancreatic swelling palpable in the lesser sac. Inspection of the root of the transverse colonic mesocolon often revealed an abscess "pointing" to the left of the middle colic vessels. Attempts to open the lesser sac by division of the gastrocolic omentum were usually inhibited by the posterior wall of the stomach, which was often fused with the pancreatic body as a result of inflammation. Peeling the stomach towards the midline was usually possible and gave a full view of the superior pancreatic border. The pancreatic tail was often masked by the inflammatory mass that involved the splenic flexure. The distal transverse colon, proximal descending colon and splenic flexure were fully mobilised to give views of the pancreas up to the junction of the body and neck. It was this region that often appeared to be the seat of the watershed between viable and necrotic tissue as judged by CT. Entering the plane behind the mobilised spleen and the tail of the pancreas allowed complete resection/debridement of the infected/necrotic body and tail of the pancreas and peripancreatic fat. The pancreas at the neck often appeared to be viable, although it was sometimes impossible to over-sew the remnant pancreatic neck/head at this point. The splenic artery was usually palpable despite the inflammatory mass along the superior border of the pancreas in the region of the neck and this was pinched off and double tied at this point. The splenic vein was tackled after the spleen and body and tail of the pancreas had been reflected to the right, allowing clear visualisation of the splenic vein as it traversed the mid-part of the gland on the posterior aspect. The vein was suture ligated and divided whilst on the back of the pancreas and the remnant vein peeled back to lie within the retro-peritoneum leaving a 3- to 4-cm splenic vein stump proximal to its confluence with the superior mesenteric vein to form the portal vein. This was a surprisingly straightforward and controlled process, although difficult retroperitoneal bleeding was not unusual but controlled. At the end of the procedure the left upper quadrant was clean with no macroscopic pancreatic necrosis or infection remaining. The duodenum was kocherized to allow placement of a suction drain behind the duodenum and one at hepatorenal pouch of Morrison. An irrigating tube inside the main channel was brought out through the side wall, making this a closed system. These drainage tubes are now manufactured with a cuff incorporated into the molding (Fehling Medizintechnik, Karlstein, Germany and can be obtained from Medical Bionics, Wokingham, UK). Thus two 16 drain tube was inserted to drain from removed inflamed pancreatic tail, allowing irrigation of the retro-peritoneum. An extra tube needs to be placed in tail area separately through left side. An irrigation, at a rate of 1 ltr/hour of 0.9% NaCI was maintained as long as peripancreatic fat and necrotic pancreas continued to drain, often for a period of 10-14 days. Cholecystectomy was performed in all 10 patients having gallstones. Postoperative nutrition was maintained by insertion of a feeding jejunostomy. Post-operative electrolytes derangement during peritoneal lavage by normal saline solution was though insignificant yet easily came under control by initiation of Ringer lactate solusion with sometime Darrow's to compensate more potassium deficiency and as the patients were supported with feeding jejunostomy, nutrition could maintain with satisfaction. Highlighting the main of the facts, at operation it was the intention to formally divide the pancreas at the neck after full mobilisation as described with the combination of linear stapler (Ethicon TLC-55, Ethicon, Bracknell, UK) and 2-O PDS (Ethicon). However, in 10

patients (56%) the neck proved too friable/ necrotic to obtain any meaningful closure and was therefore transacted and not over-sewn. This included the 1 patient who died postoperatively, all of whom had complete necrosis at operation. In no case was it possible to directly suture the pancreatic duct remnant. The intention was to leave at least one irrigation drain for a minimum of 14 days, in order to allow development of a tract for egress of pus post-removal. In our experience, the right-sided abdominal drain was generally unproductive and was removed by day 10 in every patient. The irrigation fluid remained clear in this drain, despite reduction in the rate of inflow within the first 72 hours. The situation with the left-sided abdominal drain was different. Irrigation was maintained at a maximum rate (1 L/hour) for a minimum of 1 week. A reduction in the rate of inflow within that period was usually rewarded by an obvious thickening in effluent-containing tissue fragments. It was important to remain vigilant and milk the drain regularly in order to avoid blockage. This drain fell out on day 13 in 2 patients and was removed after a median of 20 days (Range 13-39) in the rest.

Statistical Analysis: Statistical analysis was performed using GraphPad Prism Software (GraphPad Software, San Diego, CA, USA) and continuous variables expressed as medians (Interquartile range).

RESULTS:

Eighteen patients underwent pancreatic necrosectomy of whom 9 were male. This accounted for 4.5% (18 out of 403) of the total number of patients admitted with acute pancreatitis during the study period. The median age of the group was 61 years (Range 36-69). The median time for operation after presentation was 27 days (Range 2-74). The median APACHE II score at the time of operation was 11 (Range 8-17). The aetiology was gallstones in 10 patients (54%), idiopathic in 5 (28%), alcohol in 1 (6%), trauma in 1 (6%), and post-parathyroidectomy in 1 (6%). Contrast-enhanced CT revealed diffuse or complete pancreatic necrosis in 9 patients (50%), necrosis of the neck and body in 6 (33%), of the head and tail in 1 (6%), of the body and tail in 1 (6%), and solely of the tail in 1 (6%). Microbiological culture confirmed infected necrosis in 14 patients (78%) and in 13 out of 17 patients (76%) who survived their operation. One out of 18 (6%) patients died within 30 days of operation. That patient was in established multi-organ failure at the time of internal referral for operation; established renal failure and required preoperative ventilation. The patient had been admitted under the chest physicians with an empyema that was later proven to be related to a pancreatic abscess and had fulminate acute pancreatitis. The patients who died was 65 years old and had higher APACHE II scores (15) than the survivors. The procedure-related mortality was 1. The remainder survived their operation; however, of this group 1 an elderly man with chronic obstructive airways disease died of bronchopneumonia 63 days later. Since this occurred in a convalescent home technically associated with the hospital, this increased the overall hospital mortality to 11% (2 out of 18), even though this patient was previously been seen in outpatients for review and declared well. Of the 17 patients who survived the procedure, 12 (80%) required no further operations. Three underwent further laparotomy for sepsis, 2 of whom required a colectomy for ischaemia. Hemofiltration was required in 3 patients, 6 patients had episodes of septicaemia, 2 patients developed pneumonia and 2 suffered pulmonary embolism. Six patients (35%) developed a wound infection, which in all cases affected the left half of the chevron incision and resulted in a persistent discharge of pus in 4. However, all wounds were fully healed within 3 months. None of the patients developed a pancreatico-cutaneous fistula. Median hospital and ICU stays were 43 days (Range 30-57) and 5 days (Range 4-6) respectively. Long-term follow-up (3 years post-inclusion of the last patient) has demonstrated 8 out of 14 (57%) of long-term survivors to require at least occasional pancreatic enzyme supplementation and 5 (36%) to have developed diabetes mellitus, of whom 2 have type 1 diabetes. One patient developed an incisional hernia.

DISCUSSION:

Pancreatic necrosis may occur in severe acute pancreatitis[13] and is defined as diffuse or focal area(s) of non-viable pancreatic parenchyma, typically associated with peripancreatic fat necrosis. A complex and fulminant process, it is associated with substantial use of hospital resources and expense.[14] There are substantive differences in the reported incidence of pancreatic necrosis in various study cohorts presenting with acute pancreatitis varying between 4% and 20%.[15,16] The introduction of the Atlanta classification,[13] the APACHE II scoring system and CT classification[17] has facilitated a more meaningful comparison of the incidence of necrosis and the results of therapeutic intervention. The degree of pancreatic necrosis and peripancreatic inflammation can be assessed using bolus contrast-enhanced CT[18]; however, unless gas is seen within the pancreas or peripancreatic tissues, CT is of no value in identifying those patients with super infection. Some advocate the use of CTguided fine-needle aspiration;[4] however, this is not without problems including false-negative results (20%),[19] and has the theoretical risk of introducing infection into sterile necrosis. In the present series, fine-needle aspiration was not routinely used and the decision to proceed to operation was based on a combination of clinical, radiological and biochemical factors. Infected pancreatic necrosis is associated with substantial mortality. Beger et al[20] found hospital mortality to be significantly higher for those patients with infected necrosis compared with those patients with sterile necrosis. Whilst it is universally accepted that infected pancreatic necrosis requires surgical intervention,[21] the management of patients with sterile pancreatic necrosis is more controversial.[4,22] Those who advocate operation in patients with sterile pancreatic necrosis claim that these patients are as acutely ill as their infected counterparts, and that operation can be a favourable turning point for those patients with organ failure if carried out with acceptable mortality and complication rates.[19,22] Fernandez-del Castillo et al[22] studied 64 patients who underwent pancreatic necrosectomy and found no difference between infected and non-infected pancreatic necrosis in terms of outcome and overall mortality rate. Others maintain that most patients with sterile pancreatic necrosis should be managed conservatively. Rau et al[23] reported a series of 172 consecutive patients with sterile necrosis, of which 107 patients required debridement and 65 were treated conservatively and found no significant difference in mortality rates. The authors concluded that most patients with limited sterile necrosis do not require debridement, persisting or increasing organ complications being the only indication for operation. Bradley and Alien4 reached a similar conclusion, comparing 11 patients with sterile necrosis, treated conservatively with 27 patients with infected necrosis treated by open drainage. Early surgical intervention may also be associated with the theoretical risk of introducing infection and increased

mortality. Uomo et al[24] reported a study of 169 patients with sterile pancreatic necrosis of whom 23 (14%) underwent surgical debridement. They found that the mortality rate was significantly lower (10% vs. 22%) in the non-operated group than in the surgical group. Despite a lack of prospective controlled data on the subject, it would appear that most patients with sterile necrosis can be managed with aggressive supportive therapy with only those patients with progressive deterioration requiring necrosectomy.[25] This was the policy adopted in the current study. Most surgeons would agree that a maturation period between the initial pancreatic insult and subsequent necrosectomy is desirable,[26] making differentiation between viable and non-viable pancreatic tissue easier and allowing the endarteritis obliterans process to become complete.[27] This is supported by one of the few prospective randomised studies performed in necrotising pancreatitis patients by Mier et al. [28] They randomise patients to either early or late necrosectomy and found a difference in mortality rates of 56% vs. 27% with an odds ratio for mortality of 3.4 times higher in early necrosectomy patients, although this did not reach statistical significance. The exact length of time that is desirable before performing necrosectomy is undetermined, but most authors recommend a period of 1 month from the onset of the illness if possible.[22,28] In the present study, the median number of days from initial insult to intervention was 27 days. The timing was not deliberate, although it was recognised that allowing a period for the necrosis to mature made surgical resection easier. Instead, the decision to operate was made after careful support of the patient, usually with a combination of enteral and parenteral nutrition and careful observation. The typical scenario was one of initial attack followed by a period of stability and then subtle deterioration, most often evidenced by pyrexia and a rise in inflammatory markers and with no likely cause other than the pancreatitis. Under those circumstances, CT was arranged to exclude the possibility of a drainable collection and if not possible surgical laparotomy was performed. This study reflects the results in all patients managed in this way under one senior surgeon, but does not include data relating to every patient admitted to our Institution with acute pancreatitis, as only those with complicated disease requiring operation were referred to. Whilst it is agreed that infective necrosis demands operative intervention, there is no consensus or clear guidelines on the correct surgical approach.[29] Excellent results have been obtained with debridement and closed packing[22] debridement and local lavage [20, 30] and debridement with open drainage.[31] A review of the literature performed by D'Egidio and Schein[32] found mortality rates of 36%, 23% and 25% respectively for the above three techniques. The authors concluded that the surgical approach should be tailored to the individual operative findings, surgical experience and clinical course. A minimally invasive approach offers some obvious potential benefits.[33] However; this must be compared with a logical gold standard of controlled removal of all retroperitoneal sepsis. In Leeder's study[34] of acute pancreatitis in a specialist referral centre, over half of the 144 patients were transferred from other hospitals and the mortality associated with pancreatic debridement was 70%. If the expectation is that a single procedure along with postoperative irrigation can eradicate sepsis safely, but with the theoretical morbidity associated with splenectomy and removal of viable pancreas, then this must be balanced against high mortality rates and also the morbidity of repeated surgical intervention. Beger[35] describes controversy surrounding the different approaches to necrosectomy and prefers closed management with postoperative lavage of the lesser sac after extensive surgical debridement. However, he does emphasise the dominant role in the survival of these patients being served by the extent and completeness of necrosectomy. Beger feels that semi-open techniques involving multiple re-operations are associated with prolonged ICU stay, the risk of local bleeding, intestinal failure, mechanical ileus and incisional hernia. We share this prejudice and although our approach has been associated with an incidence of diabetes of 5 out of 14 (35%) on long-term follow-up, we have had no GI fistulae and emphasised that 12 out of 15 patients required a single procedure. The technique of careful piecemeal necrosis removal can be associated with significant haemorrhage (26% in the study by Sarr et al)[36] and is less likely with controlled anatomical resection. The technique developed over the early course of this study evolved and changed to a more formal resection with deliberate splenectomy and distal pancreatectomy and compares with the philosophy adopted by Aldridge et al. [11] This allowed a more complete clearance of the pancreatic bed and allowed attempted control of the main pancreatic duct remnant, which has been reported to be ruptured in up to 70% of patients requiring surgical intervention compared with 23% of patients treated conservatively.[24] Whilst we are aware; this may mean resection of some normal pancreatic tissue, we feel this is outweighed by the advantages of a more thorough debridement. There are limitations associated with this prospective, but clearly non-randomised and selective group of patients. However, they do represent a consecutive series of patients managed in a specific and consistent way. Continuous postoperative lavage as opposed to open packing has been demonstrated to allow safe evacuation of devitalised tissues without the need for routine reoperation[30] with minimal risk of gastrointestinal fistula formation or postoperative haemorrhage.[32,37] The authors are aware of the recognised risks following splenectomy,[38,39] but feels this to be small compared with the advantages to be gained from a more complete one-off debridement set against the background of a condition with at least 20% mortality. There was no significant electrolytes abnormality during pre- or post-operative period. However, the nutrition and biochemical stability could easily be controlled by feeding jejunostomy and parenteral fluid therapy of specific type.

CONCLUSIONS:

There is a belief that operative intervention in infected necrotising pancreatitis should be aggressive with aa attempt to remove all macroscopic infected necrotic tissue, whilst allowing effective subsequent drainage of residual disease. We are uncomfortable with piecemeal removal of floating sequestra, leaving portions of infected necrotic pancreas. We accept the planned removal of the spleen at pancreatic debridement to be controversial, but have little doubt that at the end of the procedure described we have radically removed all macroscopic pancreatic and peripancreatic sepsis. Whilst we accept that we are unable to remove all macroscopic dead tissue when necrosis is associated predominantly with the head of the gland, we feel that by removing the body and tail we are in a position to wash out remnant necrosis associated with the head by continuous postoperative irrigation. We would not recommend acute resection of the pancreatic head in view of the likely risk of significantly higher morbidity and mortality; however, necrosis located solely within the head is unusual. The timing of surgical debridement (Approximately 28 days into the illness) was in keeping with that suggested by others. The fact that infection of

pancreatic necrosis was confirmed in 78% of our cases confirms to us that surgical debridement was necessary. The majorities of surviving patients had a single operation, were housed for a relatively short period on the ICU and underwent retroperitoneal irrigation for a few weeks. Mortality and morbidity were favourable when compared with published data. We recognise that our numbers are relatively small and that centralisation of the management of this condition within a tertiary care centre is advantageous as long as patients are referred early enough and before the onset of multi-organ failure. However, we do feel that there is a place for radical anatomical resection in the management of complicated acute severe type of pancreatitis. We also agreed that this type of pancreatitis with highest morbidity and mortality with requirement of much financial support should bring under national health scheme and under mass insurance coverage. Community counselling should be done and awareness regarding ill affect of alcohol and prevention of pancreatitis and early medical care are needed.

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Original Article

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Role of D-Dimer as Predictive Marker in Patients with Acute Pancreatitis: an Observational Study

ABSTRACT

Introduction: Acute panreatitis, although usually mild and self-limiting entity, yet sever form of it may reach mortality upto 35%.Early prediction and optimal caremay improve prognosis even in the most severe forms. However, itis still a challenge to identify these poor prognosis cases in early stage of the disease. Serum D-dimer, a fibrin degradation productwas recently described as anEarly predictive marker of pancreatitis outcome.

Aim: The aim of the present study is to evaluate the efficacy of serum D-dimer in the prediction of severity and outcome of acute pancreatitis.

Methods: A prospective observational study of 109 patients with acute pancreatitis was done at Silchar Medical College and Hospital from 1st June 2019 to 31st May 2020. Ranson score and serumD-Dimer measurement was done for all the selected patients. The patients were stratified into categories of severe pancreatitis, organ failure, pancreatic necrosis and the number of deaths. Later in each of these categories, Ranson score and D-dimer values were compared.

Results and observation: Of the total 109 patients, 22.93% developed severe acute pancreatitis, 20.18% Organ failure, 29.36% pancreatic necrosis and 11.93% died. ROC curves were generated and Cut-off value of D-dimeris determinedand cut-off value for Ransons score is set at 3 for severity, organ failure, necrosis and death. On comparing the high D-dimer level with the Ransons score, the study found that it has high sensitivity but lower specificity than Ranson in predicting of Severity ($p<0.0001$) and development of Organ Failure ($p<0.001$). The study also found similar sensitivity and specificity of both parameter in predicting Pancreatic Necrosis ($p=0.001$) and similar sensitivity but high specificity in predicting mortality($p<0.001$)

Conclusion: In conclusion, the study found that D-Dimer is an easy and reliable tool for assessment of severity and prognosis of acute pancreatitis.

KEY WARD: D-dimer, Ranson score, Acute pancreatitis.

Acute pancreatitis (AP) is characterized by a spectrum of symptoms, ranging from a local inflammatory process to the more severe form (acute necrotizing pancreatitis) which is associated with a systemic inflammatory response. Although most of the patients have a mild form of the disease and recover well, yet approximately 20% patients develops sever form, which causes high mortality rate (15–35%)[1].Early prediction and optimal care may improve prognosis even in the most severe forms[2].However, it remains a challenge to identify these poor prognostic cases in early stage of the disease. Besides several existing scoring systems, diagnostic and imaging procedures and biochemical variables, no method has been found full proof in the detection of the disease's severity in its early stage.

Serum D-dimer a fibrin degradation product is a biomarker that indicates global activation of haemostasis and fibrinolysis[3]. Elevated plasma levels of D-dimer are recently described as an Early predictive marker of pancreatitis outcome. However, few

literatures are available describing its role. Therefore, the present study is conducted with the aim to evaluate the efficacy of serum D-dimer in the prediction of severity and outcome of acute pancreatitis.

METERIAL AND METHOD

After getting ethical clearance, a prospective observational studyon109 patients presenting with acute pancreatitis was conducted at Silchar Medical College and Hospital from 1st June 2019 to 31st May 2020. Patient who are admitted with the diagnosis of acute pancreatitis were selected for the study after obtaining their consent. Serum D-Dimer level is measured at admission or as soon as possibleand Ransonscore of all patients were calculated at the time of admission and within 48 hours. The patient were then followed up and were stratified into categories of severe pancreatitis, organ failure, pancreatic necrosis and the number of deaths. Cut off value of the d-dimer is calculated by using receiver operating curve (ROC) and cut for Ranson score is taken as three and then sensitivity, specificity, Area under curve and P value were calculated using SPSS soft wear version 1.0.0.1406.

RESULTS

In this study out of 109 patients, 64 (58.7%) patients were males and 45 (41.3%) patients were females. Male to female ratio was 1.42:1. Most of the patients i.e., 55 (50.4%) patients were in age group of 21-40 years. Mean age of the patient was found to be 35±13years(as shown Fig 1)

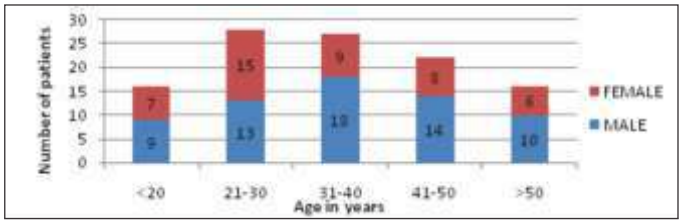

Fig 1:- Distribution of patient according to age and sex.

During the studyout of 109 patients,17 patient remains uncomplicated with mild to moderate symptoms, 25 (22.93%) patients developed severe acute pancreatitis, 22 (20.18%) patients developedOrgan failure, 32 (29.36%) patientsdeveloped pancreatic necrosis and 13 (11.93%) patientsdied(as shown Fig 2).

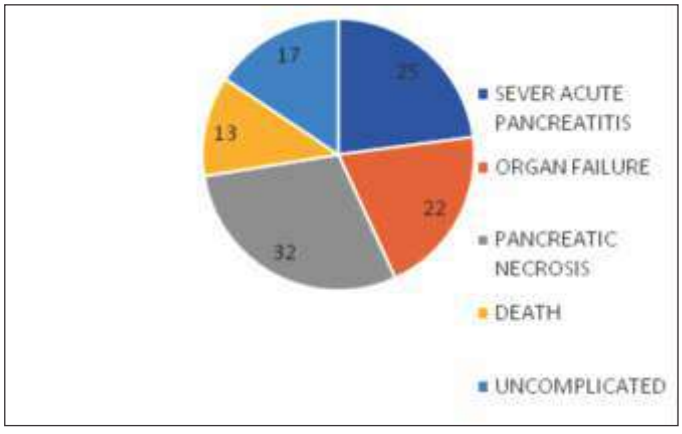

Fig 2:- Distribution of patient according to outcome.

In predicting severity of Acute Pancreatitis (AP),with the cut off value for D-Dimer 1397µg/L and for Ranson score 3, serumD-Dimer was found to have high sensitivity but lower specificity than Ransonscore. AUC of D-Dimer for prediction of severity of disease was high (0.914) with a p value <0.0001(as shown Fig 3 & table 1).

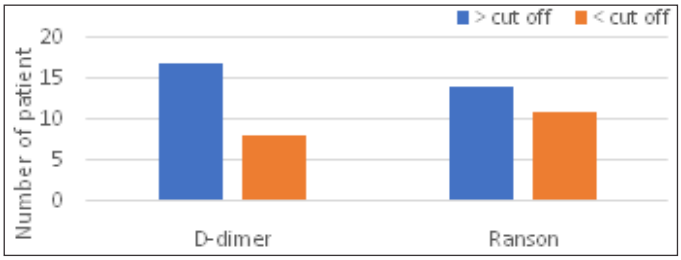

Fig 3:- Distribution according to d-dimer value and Ranson in prediction of sever acute pancreatitis

STATISTICS	VALUES FOR D-DIMER	VALUES FOR RANSON'S
AUC	0.914	0.899
SENSITIVITY	0.80	0.600
SPECIFICITY	0.84	0.933
PPV	0.631	0.75
NPV	0.9268	0.875
ACCURACY	0.833	0.850

Table 1:- Showing different measurement of D-dimer and Ranson in predicting severity

In prediction of development organ failure in acute pancreatitis, with the cut off value for D-Dimer 1886µg/L and forRanson score 3, D-Dimer was found to have high sensitivity but lower specificity than Ranson score . AUC of D-Dimer for prediction of organ failure in AP was high (0.950) with p value <0.001(as shown Fig 4 & table 2).

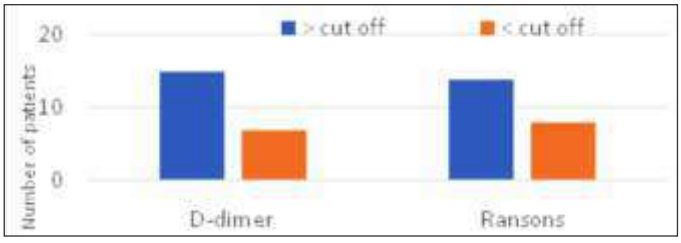

Fig 4:- Distribution of patients according to d-dimer value and Ranson in prediction of organ failure in acute pancreatitis.

STATISTICS	VALUES FOR D-DIMER	VALUES FOR RANSONS
AUC	0.950	0.908
SENSITIVITY	0.833	0.750
SPECIFICITY	0.854	0.937
PPV	0.588	0.750
NPV	0.953	0.937
ACCURACY	0.85	0.900

Table 2: - Showing different measurement of D-dimer and Ranson in prediction of organ failure.

In prediction of pancreatic necrosis, with the cut off value for D-Dimer 1890µg/L and forRanson score 3, the study found that both D-Dimer and Ranson have low sensitivity. But the specificity of both are high i.e.,78.9% and 84.2%respectively. Accuracy of D-Dimer and Ransons were also similar. AUC of D-Dimer for prediction of pancreatic necrosis in AP was 0.715 with p value 0.001(as shown Fig 5& table 3).

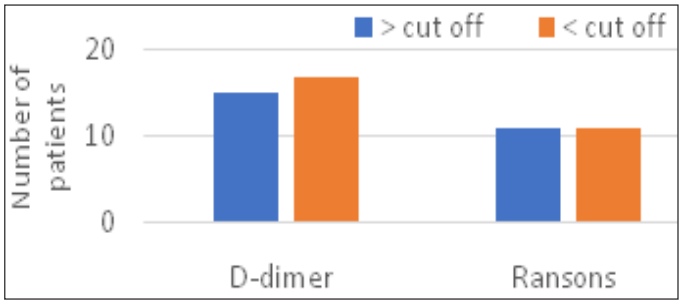

Fig 5:- Distribution of patients according to d-dimer value and Ranson in prediction of pancreatic necrosis in acute pancreatitis.

STATISTICS	VALUES FOR D-DIMER	VALUES FOR RANSON
AUC	0.715	0.578
SENSITIVITY	0.454	0.272
SPECIFICITY	0.789	0.842
PPV	0.556	0.500
NPV	0.7143	0.666
ACCURACY	0.666	0.633

Table 3:- Showing different measurement of D-dimer and Ranson in prediction of pancreatic necrosis.

In the prediction of mortality, with the cut off value for D-Dimer, 5769µg/L and for Ranson score 3, D-Dimer and Ranson have similar sensitivity of 66.6%. However,the specificity of D-Dimer was found to be higher than the Ranson in predicting mortality in AP. Accuracy of D-Dimer was also higher than the Ranson for development of mortality. AUC of D-Dimer for prediction of mortality in AP was high(0.959)(as shown Fig 6 & table 4).

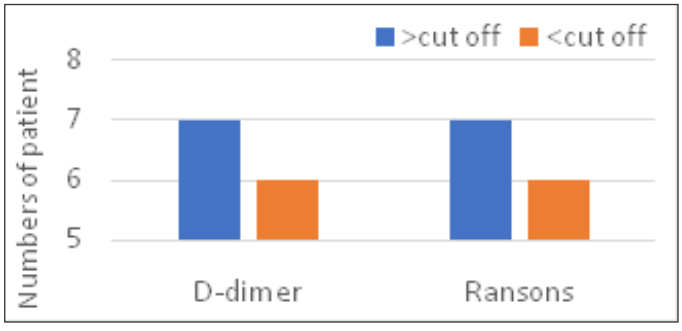

Fig 6:- Distribution of patients according to d-dimer value and Ranson in prediction of mortality.

STATISTICS	VALUES FOR D-DIMER	VALUES FOR RANSONS
AUC	0.959	0.816
SENSITIVITY	0.666	0.666
SPECIFICITY	0.987	0.824
PPV	0.666	0.166
NPV	0.982	0.979
ACCURACY	0.966	0.816

Table 4:- Showing different measurement of D-dimer and Ranson in prediction of mortality.

DISCUSSION

In this prospective observational study, of patient diagnosed with acute pancreatitis, the study has found high plasma level of D-dimer are associated with prognosis and outcome of the disease. On comparing the high D-dimer level with the Ransons score,the study found that it has high sensitivity but lower specificity than Ranson in predicting of Severity and development of Organ Failure.In the prediction of severity, the present study got similar value of Ransons score as that of the studies conducted by Zang et al[4] and Khanna et al[5]. The sensitivity of d-dimer in prediction of severity was similar to the study of Gomercic Cet al[6], but lower than the study of Sreekanth Appasaniet al[7]. However, the specificity of the present study was found to be less than the studies of Gasseric et al[6] and Sreekanth Appasani et al[7].For the prediction of organ failure, the present study has lower sensitivity of d-dimer (85.3%) but comparable specificity(85%) than the study of Aleksandra Boskoic et al.

The study also found similar sensitivityand specificity in predicting Pancreatic Necrosis and similar sensitivity but high specificity in predicting mortality. In prediction of necrosis, the d-dimer had higher accuracy in predicting necrosis than Ransons which is similar to the study of Aleksandra Boskoic et al[8] .In prediction of mortality, similar to the studies of Khanna et al[5], Papachristou et al[9], and Park et al[10]. the present study have found that AUC of d-dimer is the best predictor for mortality in comparison to Ransons. However, in comparisons to Maeda et al[2], the sensitivity is lower (66.6%)and specificity was higher (98.7 %) in the present study.

So D-dimer value can be used for early stratification which will enable the selection of individual patients for prompt aggressive intensive care that can decrease the mortality and morbidity of acute pancreatitis. The present study has also demonstrated that plasma levels of D-dimer is an accurate marker for the early assessment of its systemic complications

CONCLUSION:

On comparing the D-Dimer value with the already establish RANSON scoring it can be concluded that it is an easy, reliable and accurate tool for assessment of severity and prognosis of acute pancreatitis. However, since the sample size is small and all the sample belongs to the same region, it may not be a representative of

the entire population. Therefore,detail research init with larger patient base and among different groups and subgroups, would derive new insights upon its efficacy and benefit.

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Original Article

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Pre-Operative Prediction of Difficult Laparoscopic Cholecystectomy by Estimation of High Sensitive C - Reactive Protein(Hs-CRP) Along With Ultrasonographic findings- A Study

ABSTRACT:

BACKGROUND

Laparoscopic cholecystectomy is considered to be the gold standard for the treatment of gallstones. However, conversion of laparoscopic cholecystectomy to open cholecystectomy is done by surgeons in difficult cases. The aim of the study is to use Hs-CRP level in correlation with ultra-sonographic findings to predict difficult laparoscopic cholecystectomy pre-operatively. It would help in anticipating a difficult laparoscopic cholecystectomy preoperatively, better counseling of patients, avoiding unnecessary laparoscopic dissection and hence less morbidity.

MATERIALS AND METHODS

This study was conducted in the department of general surgery of Gauhati Medical College and Hospital. The study group included 40 consecutive patients undergoing laparoscopic cholecystectomy for cholelithiasis. Cholelithiasis was diagnosed on the basis of ultrasonography. Hs-CRP level was determined pre-operatively and postoperatively after 6 hrs and 12 hrs. It was correlated with ultra-sonographic findings to predict difficult cholecystectomy.

RESULTS

The mean value of Hs-CRP was found to be 9.68 mg/L preoperatively, 21.88 mg/L at 6 hours and 26.57 mg/L at 12 hours. The mean value of Hs-CRP was found to be significantly higher in cases that needed conversion. USG findings such as presence of adhesion, GB wall thickness more than 3 mm, and narrow Calot's triangle, were found to be significant predictors for conversion. On correlation, the positive predictive value increased.

CONCLUSION

Pre-operative values of Hs-CRP when combined with ultrasonography findings, can predict difficult cholecystectomy. It will help in better selection of patients, and help in decreasing morbidity.

KEYWORDS: Laparoscopic cholecystectomy, Hs-CRP, Ultrasonography, Conversion

Gallstones are among the most common gastrointestinal illness requiring surgery. They are a major cause of morbidity and mortality throughout the world.[1] Laparoscopic cholecystectomy has been recognized as the gold standard for the treatment of gallstones.[2] Currently it is estimated that over 75% of cholecystectomies are performed using laparoscopic approach[3].

The advantages include earlier return of bowel function, less postoperative pain, improved cosmesis, shorter length of hospital stay, earlier return to full activity and decreased overall cost [3,4,5]. However very often surgeons face a number of surgical and technical difficulties while performing the procedure due to which the procedure has to be converted into open cholecystectomy. The conversion rate for elective laparoscopy

cholecystectomy varies from 2%-15%[6,7,8,9]. Inability to define the anatomy and difficult dissection are the leading reasons for conversion followed by other complications like bleeding. It has now become one of the most common operation performed by general surgeons.[10]

CRP is an acute phase reactant protein synthesized by the liver in response to factors released by macrophages and adipocytes in the face of inflammation. During the acute phase response, level of CRP rapidly increases within 2 hrs of acute insult, reaching a peak at 48 hrs. CRP declines with a relatively short life of 19 hrs. The Hs-CRP assay is an advanced quantitative analysis using laser nephelometry. It can measure very low levels of C- reactive proteins. It has been shown to be more accurate in predicting risk of morbidity in undertaking lap cholecystectomy in normal people than standard CRP.

Till today, ultrasound has been a widely used modality for predicting the difficult laparoscopic cholecystectomy in pre-operatively. Due to its several advantages like safety, wide availability, etc it is preferred as an initial imaging study. Ultrasound shows stones in the gallbladder with a sensitivity and specificity of more than 90%.

This study was undertaken to see if there is any correlation of Hs-CRP in assisting and improving the accuracy of ultrasonography in predicting difficult Laparoscopy. This would help a surgeon to anticipate better a difficult cholecystectomy, better pre-operative counselling of patients, avoid excessive intraoperative manipulations, go for conversions early, reduce time of surgery and hence also minimize post-operative complications.

MATERIALS AND METHODS:

This study was conducted in Gauhati Medical College and Hospital in Guwahati, Assam. The study period was from 1/7/18 to 30/6/19. The study population comprised of 40 consecutive patients undergoing laparoscopic cholecystectomy after fulfilling the inclusion criteria. Patients having Asymptomatic gallstones, acalculous cholecystitis, associated choledocholithiasis, malignancy, pregnancy, patients under steroid therapy/local tissue irradiation, coagulopathies, previous operation of hepatobiliary system or upper GI surgery, any associated illness contraindicating cholecystectomy surgery and any associated illness leading to rise in CRP levels, were excluded from the study. Informed consent was taken. Patients were also informed that in case of much difficulty, laparoscopy would be converted to open cholecystectomy. Cases were diagnosed as having cholecystitis due to cholelithiasis on the basis of ultrasonographic findings. The cases were prepared for laparoscopic cholecystectomy as per standard protocol followed in our institution. Relevant investigations were done. It included random blood sugar, complete hemogram, Liver function test, renal function test, thyroid function test, chest x-ray, ECG, and ultrasonography of whole abdomen. The Hs-CRP level was determined pre- operatively and at 6 hrs and 12 hrs. 5 ml venous blood was collected in clot vials for transfer to biochemistry laboratory. The samples were analyzed by the help of kit made by ROSS co., Germany for COBAS INTEGRA 400 analyzer. At the time of admission, a thorough history, general and clinical examination was carried out and records were maintained. The age group was between 21-60 yrs.

Surgical Procedures: All the surgeries were performed by consultant and done under general anesthesia. Pneumoperitoneum was first created by using a Verres needle through an infraumbilical port. A total 4 ports were used, 2 of 10 mm size and 2 of 5 mm size. Adhesion was released first. Dissection was done to make the Calot's triangle defined. The cystic artery and cystic duct was separately clipped and divided. The gallbladder was then dissected off the gallbladder fossa, using the monopolar cautery hook. At the completion of surgery, gallbladder was taken out using the epigastric port. The port was enlarged if needed. A saline lavage was done. Hemostasis was achieved. Drain was placed whenever indicated. Ports were closed. When conversion was needed, it was done through right subcoastal incision.

Statistical Analysis: Normally distributed continuous variables were compared using the paired t- test. Categorical variables were analysed using the Fischer exact test. For all statistical tests, a p-value less than .05 was taken as significant. ROC analysis curve was plotted for values of Hs-CRP and it sensitivity for prediction of conversion.

RESULTS:

Patients Demographic: The total number of cases was 40 with 11 males and 29 females. Gender and age wise these were comparable as the p value was found to be 1.000 using Fischer exact test. The male: female ratio was found to be 1:2.6. There were total of 8 cases in the age group of 21-30 yrs, 13 cases were in the age group of 31-40 yrs, 16 in the age group of 41-50 yrs and 3 in 51-60 yrs. The mean age of incidence was found to be 39.65 yrs.

Out of 40 cases, 3 cases required conversion to open cholecystectomy. Among these 3 cases, 1 is male and 2 are females, p value was found to be 1.000, which meant the difference is insignificant. The cases which required conversion were equally divided across the age group of 31-40, 41-50, 51-60 yrs. The conversion in respect to age group and gender was found to be insignificant. But it is difficult to comment as sample size was small.

Conversion in Relation to USG: For a thickened gallbladder, the cut-off value was taken to be 3 mm on ultrsonography. Thickened gallbladder was found in 7 cases. Out of which 3 cases required conversion to open cholecystectomy. The p-value was found to be 0.0035 which reflects GB wall thickness as a significant risk factor. On USG, 6 cases had adhesion present, out of which 3 cases needed conversion to open cholecystectomy. The presence of adhesion is a significant risk factor for conversion. In 5 cases, Calot's triangle was observed to be narrowed radiologically, out of which 3 cases required conversion. The p value was found to be 0.0010. It reflects narrow Calot's triangle as a significant risk factor for conversion. The p value of the difference in conversion rate among patients with single gallstones was found to be 0.498 using Fischer exact test. Therefore, the difference in conversion rate among patients having single or multiple calculi is not significant. In relation to number of calculi in gallbladder seen radiologically it was found that one case had single calculi and two cases had multiple calculi, among the three cases which required conversion. However, the p value of the difference in conversion rate among patients with single gallstone and multiple gallstone was found to be 0.498 using Fischer exact test, which is not significant.

Conversion in Relation to Hs-CRP: The mean pre-operative value of Hs-CRP was found to be 9.68mg/l. It increased to 21.88 mg/l 6 hrs post-operatively and increased to 26.57 mg/l 12 hrs postoperatively.

The mean pre-operative value of Hs-CRP in cases which needed conversion was found to be 65.3mg/L and 118.9 mg/L 6 hrs post-operatively, 129 mg/L 12 hrs post-operatively. The difference in values of Hs-CRP between the cases who underwent laparoscopic cholecystectomy successfully and converted cases were found to be significant. The presence of high level of Hs-CRP gives a very good indication of ongoing inflammation in the body. Studies have shown that in case of inflammation there is rise in level of CRP within 4-6 hours. It reaches a peak value in two days and thereafter declines. Therefore, the values of Hs-CRP are also significant in understanding recovery as it should decline after 2 to 3 days in absence of any infection postoperatively.

On using a cut off value of Hs-CRP more than 20 mg/l preoperatively, sensitivity was found to 100% and specificity was 94.5%. As the cut off value was increased progressively upto 50 mg/l, the sensitivity fell to 66.66% and specificity remained same at 100%.

On combining USG parameters with different Hs-CRP cut off values, it is observed, as we increase the cut off from 20 mg/l to 50 mg/l, the sensitivity remains same for 20 mg/l, 30 mg/l, and 40 mg/dl. However it decreases for 50 mg/l. Both positive and negative predictive values were serially analysed with different cut off points for Hs-CRP values. An improvement in positive predictive value is observed, as the cut-off of Hs-CRP concentration is raised while negative predictive value remained at 100 percent and fell to 97.36 percent for cut-off value of 50 mg/dl. It is done between these two parameters only, as this was aim of the study.

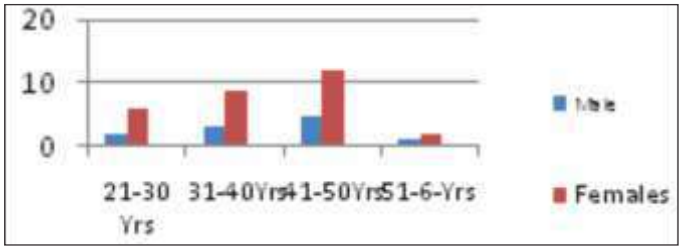


Fig 1: Age and gender distribution of study group

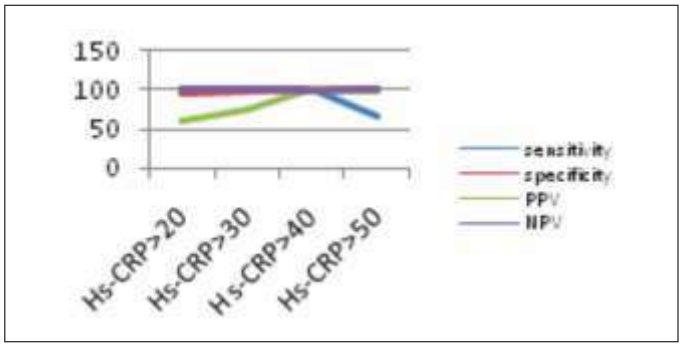


Fig 2: Showing the specificity-sensitivity analysis for conversion from LC to OC using different cut off of Hs - CRP from more than 20 mg/l through 30 mg/l, 40 mg/l, 50 mg/l

TABLE 1:
Mean and standard deviation of values of Hs- CRP, preoperatively and post operatively at 6 Hrs and 12 Hrs.

Group parameter	N	Mean	Standard deviation
Cases- pre op CRP	40	9.68	±17.66
Cases- post op at 6 hrs CRP	40	21.88	±31.2
Cases- post op at 12 hrs CRP	40	26.57	±32.7

TABLE 2:
Sensitivity, specificity, PPV and NPV of ultrasonography combined with different pre- op cut off values of hs-CRP.

Parameters	Positive findings on USG and hs-crp>20mg/l	Positive findings on USG And hs-CRP>30mg/l	Positive findings on USG and hs-CRP>40mg/l	Positive findings on USG and hs-CRP >50 mg/l
Sensitivity(%)	100%	100%	100%	66.6%
Specificity(%)	98.7%	99.3%	100%	100%
Positive predictive value(%)	17.6%	18.75%	20%	21.4%
Negative predictive value(%)	58.7%	57.8%	56.9%	56.06%

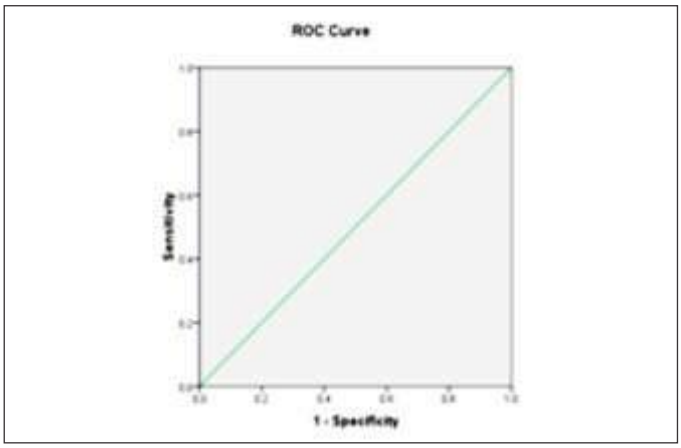
Fig.3-ROC CURVE

Case Processing Summary

VAR00001	Valid N (listwise)
Positive[a]	3
Negative	37

Larger values of the test result variable(s) indicate stronger evidence for a positive actual state.

a.The positive actual state is 1.00.



Area Under the Curve
Test Result Variable(s):VAR00002

Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
			Lower Bound	Upper Bound
1.000	.000	.004	1.000	1.000

a. Under the nonparametric assumption
b. Null hypothesis: true area = 0.5

Coordinates of the Curve:
Test Result Variable(s):VAR00002

Positive if Greater Than or Equal To[a]	Sensitivity	1 - Specificity
.2000	1.000	1.000
1.2500	1.000	.919
1.3650	1.000	.892
1.5150	1.000	.865
1.6500	1.000	.838
1.7500	1.000	.811
1.8500	1.000	.784
1.9500	1.000	.730
2.1000	1.000	.703
2.2500	1.000	.676
2.3500	1.000	.622
2.5300	1.000	.595
2.7300	1.000	.568
2.9500	1.000	.514
3.1500	1.000	.432
3.2500	1.000	.405
3.3500	1.000	.378
3.5000	1.000	.351
3.9500	1.000	.324
4.6500	1.000	.297
5.4500	1.000	.270
6.1500	1.000	.243
6.7500	1.000	.216
7.1500	1.000	.189
7.8500	1.000	.162
9.2000	1.000	.135
10.5000	1.000	.108
12.7500	1.000	.081
18.5000	1.000	.054
27.1000	1.000	.027
39.8000	1.000	.000
54.8500	.667	.000
73.9500	.333	.000
87.2000	.000	.000

Case Processing Summary

VAR00001	Valid N (listwise)
Positive[a]	3
Negative	37

Larger values of the test result variable(s) indicate stronger evidence for a positive actual state.

a. The smallest cutoff value is the minimum observed test value minus 1, and the largest cutoff value is the maximum observed test value plus 1. All the other cutoff values are the averages of two consecutive ordered observed test values.

DISCUSSION:

The male: female ratio of occurrence of gallstones was found to be almost equal to 1:3. This is in agreement with studies done by Novacek G,[11] where occurrence of gallstones was found to be 2 to 3 times higher in female. Moghaddam AA et al [12] reported a 2.73 times higher incidence of gallstones in female. The conversion rate in our study was found to be 7.5%. This is comparable to a conversion rate of 1.8% - 27.7% as reported by different authors. Kanann SA et al[13] reported a conversion rate of 10% in acute cholecystitis and 4% in chronic cholecystitis. In our study, there was no relation found between gender and age of patient with conversion. This is in contrast to several other studies. Shapiro AJ, Lein HH, and Huang CS [14,15] have reported male gender as a risk factor. Age has been recognized as an independent risk factor for conversion in studies done by Liu CV[3], Kama NA[16], S Ibrahim[17] et al. However number of cases is a limitation in our study to make a definitive comment regarding age and sex with risk of conversion. Gallbladder wall thickness more than 3 mm on ultrasonography was found to be a predictor for conversion. It is in agreement with studies done by U Jethwani, Shapiro AJ, and Tayeb M[14,18,19]. Other findings such as adhesion and narrow Calot's triangle were found to be significant predictor for conversion. This is in accordance with studies done by Volkan G (2011), Tayeb et al, Shapiro et al, Chand P et al.[14,19,20,21] Levels of Hs-CRP were determined preoperatively and post operatively at 6 hrs and 12 hrs. Our study concludes that high Hs-CRP values preoperatively predict conversion. The ROC curve reveals the highest sensitivity for Hs-CRP to be around 40 mg/l for conversion. This is in agreement with other studies done, like Schafer M et al, Kam Wa et al, Weavers KP et al, and Singh BA et al [22,23,24,25] where high values of CRP was found to be significant predictor for conversion.

CONCLUSIONS:

The study was successful in establishing that, when the pre-operative values of Hs-CRP is correlated with ultrasonography findings, it can predict difficult cholecystectomy. It will help surgeons in making better judgement, and better counselling of patients prior to surgery keeping co-morbid conditions in view. Hs-CRP with ultrasound findings and experience of the surgeon will help in better selection of patients, thus reducing morbidity and mortality.

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CASE REPORT

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Internal Hernia through Lesser Omentum - A case report

INTRODUCTION

Internal hernia refers to the protrusion of an abdominal viscus through the peritoneum or mesentery into a compartment within the abdominal cavity.Lesser sac herniation is a rare occurrence, accounting for 8% ofinternal hernias and less than 0.1% of all abdominal hernias.Approximately two-third of lesser sac herniations containthe small bowel alone. Herniation of the large bowel, gallbladder and omentum has been reported.

CASE REPORT

A 31year woman hailing from Nagaon, Assam presented in Surgery outpatient department of our facility with on and off peri-umbellical pain abdomen for 1 year. The pain first started on Day 1 after the delivery of her second child. The pain was colicky in nature. She frequently got admitted in hospital for her pain and it was only relieved after administration of parenteral analgesics. It was not associated with fever, vomiting or diarrhoea.Biochemical parameters did not reveal any abnormalities. Ultrasonography of the abdomen was done which suspected an Internal Herniation of the small bowel loops to lesser sac. CT scan of abdomen was done which confirmed the diagnosis. It showed crowing of the small loops predominantly jejunum through lesser omentum in the gastrohepatic space (lesser sac) without any signs of obstruction**[Figure 1].**

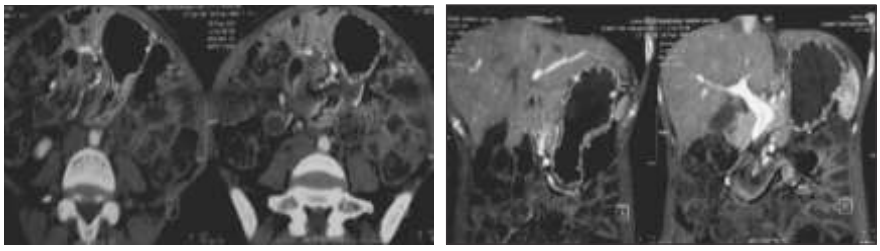

Figure 1- Transverse and Coronal sections of MDCT Whole Abdomen showing internal herniation through lesser omentum

After initial Pre-operative preparation with gastric lavage on the previous night, she was operated.Laparotomy was done and intra-operatively jejunal loops are seen heriating into the lesser sac through a rent in mesocolon and finally coming out through the lesser omentum **[Figure 2 & Figure 3]**.The loops were gently pulled out and both the rents were closed with Silk.Her post-operative period was uneventful and she tolerated liquids and semisolid food from 4th post-operative day onwards. She was discharged on the 7th post-operative day. In her first check-up after 14 days, she was doing well and was devoid of any abdominal discomfort.

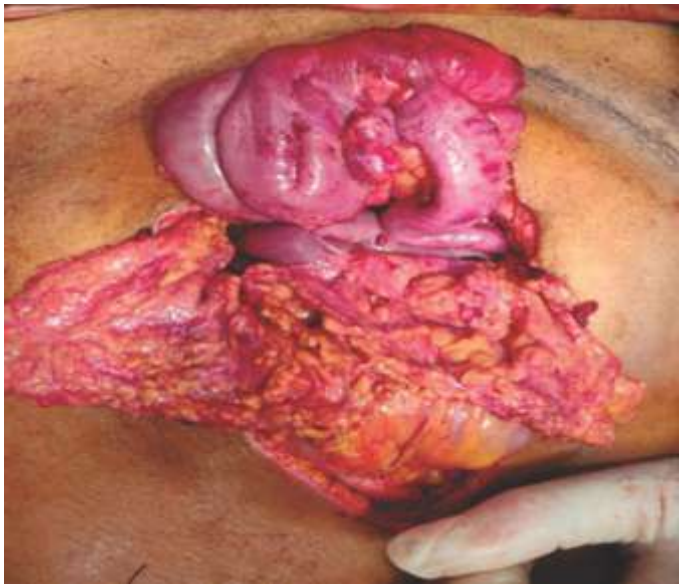

Figure2-
Intra-operatively internal herniation seen through lesser omentum

Figure3- Intra-operatively rent in mesocolon seen

DISCUSSION

Lesser sac herniation is a rare occurrence, accounting for 8% ofinternal hernias and less than 0.1% of all abdominal hernias.[1]Approximately two-third of lesser sac herniations containthe small bowel alone. Herniation of the large bowel, gallbladder and omentum has been reported.[2,3]The risk factors for lesser sac herniation include: a common intestinal mesentery; ascendingcolon that is not attached to the parietal peritoneum; a long small bowel mesentery and an enlarged epiploic foramen or lesser sac.[4] In addition, increased intra-abdominal pressure was thought to play a role.[5]Historically, lesser sac herniation has largely been diagnosed during surgery, but diagnosis is possible using imaging. On plain radiographs, the gastric bubble is displaced laterally and anteriorlyby a lesser sac mass. On CT scanning, the following features have been described: mesenteric fat and vessels posterior to the portal vein, common bile duct and hepatic artery; an air–fluid collection in the lesser sac, with "beaking" directed towards the epiploic foramen; two or more bowel loops in the high sub-hepatic spaces; and absence of the caecum from its normal anatomical position.[6,7] An important differential diagnosis is para-duodenal herniation. There is no consensus on the surgical treatment of lesser sac herniation owing to its rarity but decisions are made based on surgeons' preference and bowel viability. Generally, management involves urgent surgical reduction with bowel decompression and resection of any non-viable bowel.[8] If herniation involves the caecum, a right hemicolectomy with primary ileocolic anastomosisis the preferred option to prevent future recurrence.[9] A caecopexy is performed if the caecum appears viable.[10]

CONCLUSION

Although lesser sac herniation is a rare phenomenon, anticipating it while during abdominal examination and preliminary radiological investigations like Ultrasonography of the abdomen is necessary to prevent morbidity and mortality. Timely diagnosis is important. Management includes surgical reduction and bowel decompression and resection if necessary. The subtle findings associated with this important condition should not be overlooked when interpreting CT scans in patients with chronic pain abdomen.

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CASE REPORT

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Spontaneous Gastric Perforation in Neonates: A Report of Three Cases in a Tertiary Care Hospital

ABSTRACT:

Gastric Perforation in neonates, unlike adults is very rare and needs to be an integral part of the array for numerous differential diagnoses for acute abdomen in the neonates in their initial half of life. The precise etiology is still under evaluation although many co-morbid conditions have been found to be associated with it. Management prioritises early resuscitation along with prompt diagnosis and surgical repair.

KEYWORDS: spontaneous, neonates, gastric, perforation, pneumoperitoneum.

INTRODUCTION:

Gastric perforations in newborns are a rare surgical emergency with a potentially fatal outcome. Only about 200 cases have been described in the medical literature so far, accounting for about 7% of all neonatal gastrointestinal perforations. 1 The reported incidence is 1: 5000 live births. 1 Despite reports of spontaneous and traumatic perforations, the exact cause remains unknown. Many theories have been proposed for elucidating the etiopathogenesis like traumatic, spontaneous and ischaemic. Prematurity, birth hypoxia, aggressive resuscitative techniques, increased intragastric pressure produced by distal blockage, and anatomical anomalies of the stomach are all common causes of neonatal gastric perforations as described in medical literature. Poor outcomes are linked to male gender, metabolic acidosis, prematurity, and low birth weight. 2The clinical scenario of three cases of spontaneous gastric perforation in neonates, their diagnosis and surgical management and outcome in our hospital set up, is presented here.

MATERIALS AND METHODS:

A retrospective analysis of three neonates with gastric perforation who were admitted to Paediatric Surgery ward, Assam Medical College and Hospital from June 2019 to August 2021 was carried out. The data reviewed included birth weight, gestational age at birth, age at presentation, clinical manifestations, time interval between presentation and surgical intervention, intra-operative findings like site of perforation, size of perforation etc., and surgical outcome.

CASE REPORTS:

Case 1:

A 3-day-old, 2.2 kg male baby, with 36 weeks of gestational age and born by

spontaneous vaginal delivery, with a history of birth asphyxia, was admitted with abdominal distention and respiratory distress to the ward.Examinationrevealed a lethargic newborn with marked abdominal distention. Bowel sounds were absent. Blood picturerevealed Hb to be 7g/dl, TC =18,000/µl. All other blood parameters were normal.Abdominal X-rayrevealed huge free intraperitoneal air suggestive of pneumoperitoneum (Figure 1). The provisional diagnosis was perforative peritonitis. Patient was planned for emergency exploratory laparotomywithin 4hours after presentation.After initial exploration, confirming the cause of perforation to be absent in small bowel and large bowel, stomach was examined.Operative findings elucidated a 2 cm × 1.5 cm perforation along the lesser curvature, with inflammatory exudates all over the abdominal cavity (Figure 2). Primary repair was done along with thorough peritoneal lavage with warm saline. Postoperative periodwas uneventful and baby was discharged on 12th postoperative day.

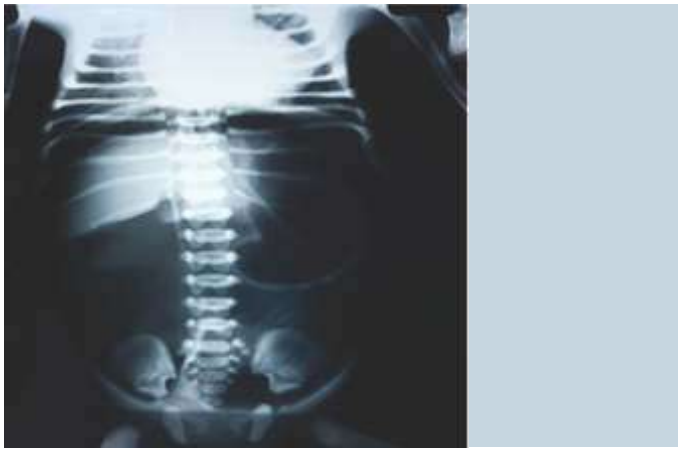

Figure 1: Abdominal Xray showing massive intraperitoneal air or pneumoperitoneum.

Figure 2: Perforation over anterior wall of stomach along lesser curvature, seen over feeding tube.

Case 2:

A 2-day-old female baby, with 33 weeks of gestational age, weighing 1.8kg at birth, delivered by LSCS at a peripheral hospital was admitted. She had abdominal distension, respiratory distress, cyanosis and hypoxaemia.Assisted ventilationwas applied and she was shifted to Neonatal ICU.Resuscitation with IV fluids, antibiotics and analgesics were done. Her Hb was 8gm/dl, TC was 21,000/µl, serum sodium was 129 mmol/L and serum creatinine was 2.1 mg/dL.Abdominal radiographconfirmed the presence of massive pneumoperitoneum. Patient was planned for emergency exploration after 48 hours of presentation.On laparotomy,a 2 cm × 2 cm gastric perforation was found to be located over the anterior wall of stomach along the greater curvature, extending to the fundus, with purulent exudative fluid all over the peritoneal cavity (Figure 3).Primary repair was done along with peritoneal lavage with warm saline.The baby expired 14 hours postoperatively. Cause of death was due to prematurity with septicaemic shock.

Figure 3: Large perforation over the anterior wall extending to the fundus of the stomach pointed by the dissecting forcep near spleen.

Case 3:

A 2-day-old male boy, weighing 2kg with 36 weeks gestational age, delivered by LSCS with a history of birth asphyxia, was admitted withabdominal distention and rapid shallow breathing.Examination revealed signs of dehydration with increased abdominal girth.Blood pictureshowed leucocytosis (TC=16000/µL), with other normal parameters.Pneumoperitoneum was depicted in abdominal X-ray (Figure 4). Patient was planned for emergency exploration within 6 hours of presentation.On exploration, a 1 cm × 1 cm perforation was found on the pylorus with exudative fluid all over the peritoneum (Figure 5). Primary repair was done along with peritoneal lavage with warm saline.Post operative follow up was uneventful. Baby was discharged on 10th postoperative day.

Figure 4:
Xray plain picture whole abdomen showing Pneumoperitoneum.

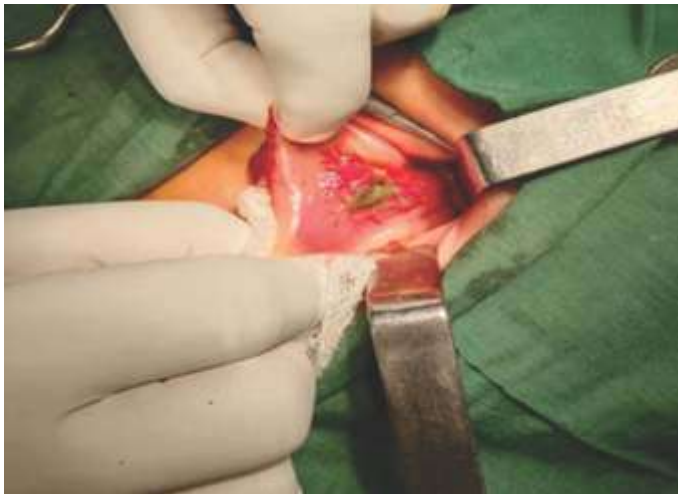

Figure 5: A small perforation over ant wall of stomach, pylorus.

DISCUSSION:

Gastric perforation in the newborn infant was first described by Siebold in 1825. 3The etiology of gastric perforation remains controversial. Herbut firstdescribed that congenital absence of muscular structure of stomach may result in perforation. 4The concept of spontaneous gastric perforation was suggested by Kara et al.'5Three mechanisms have been proposed for stomach perforation: Traumatic,ischaemic, andspontaneous. 6 Vigorous neonatal resuscitation with bag and mask most commonly leads to traumatic perforation.6In our report,two cases had history of birth asphyxia which might be a contributing factor for the perforation.The time interval between symptoms and surgical intervention reported to be the only prognostic factor for survival.2 Mortality in our case report was associated with late presentation as well as delay in definitive management.Male gender and metabolic acidosis were reported to be associated with poor prognosis. 7Irrespective of etiology, peak incidence of gastric perforation is found from 2 and 7 days of life.7Most common presentations of gastric perforation as found in our cases is abdominal distension. Pneumoperitoneum is the most common radiological feature as depicted in our cases. Gastric perforation generally occurs in the fundus and greater curvature of the stomach. 8Surgical treatment is limited to excision of necrotic tissue and gastrorrahapy.1

CONCLUSION:

Neonatal gastric perforation is a very rare but life threatening disorder with high morbidity and mortality. As the incidence is rare, more cases studied are needed for better illustration of the etiopathogenesis, clinical manifestation and causes for morbidities. Early detection and prompt surgical intervention remains an essential key to improve its outcome.

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CASE REPORT

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Spontaneous perforation of bile duct: report of two cases

ABSTRACT

Spontaneous perforation of bile duct is rare and is usually encountered in infant and children. Clinical diagnosis is rarely made because of its non-specific clinical presentation. Two cases of Spontaneous perforation of bile duct were treated; one 14 months old boy and one 11 years old girl. Both the cases presented with peritonitis. First case had perforation of the bile duct at the junction of common bile duct (CBD) and cystic duct. Child was successfully treated by cholecystectomy and simple external drainage of the perforation site. In the second case perforation could not be located accurately due to presence of slough, was treated by tube drainage of the perforation site and tube cholecystostomy. In the first case post operative magnetic resonance cholangiopancreatography (MRCP) showed normal biliary tree. In the second case cholecystography was done after two weeks and it showed normal biliary tree and free drainage of bile into duodenum.

Key words: common Bile duct, perforation, biliary peritonitis.

INTRODUCTION

Spontaneous perforation of the bile duct (SPBD) occurs without trauma or iatrogenic injury. It is extremely rare and is more often seen in infant and children. If choledochal cyst is excluded it is considered idiopathic in children but in adult it is usually due to distal obstruction, commonly due to calculi and sometimes malignancy. We report one 14 months old boy and an 11 years old girl with spontaneous perforation of bile duct.

CASE REPORTS

Case 1: One 14 months old male child presented with breathing difficulty. He was treated as a case of bronchial asthma and improved but developed abdominal distension. He did not pass stool for 3 days at the time of admission. Surgical consultation was sought; examination revealed abdominal distension with mild tenderness. Child was not icteric. His hemoglobin was 9.5 gm/dl and total count was 11,650/cmm with 59% polymorph, 34% lymphocyte and 7 % monocytes. Serum bilirubin was 0.88 mg/dl; aspartate amino transferase (ALT) was 42 U/L; and alanine amino transferase (AST) was 24 U/L. Ultrasonography of the abdomen showed dilated bowel loops with moderate ascites. Gall bladder and biliary tract were normal. Diagnostic aspiration was done and it revealed bilious fluid. Clinical diagnosis of bowel perforation was made and laparotomy was done through a standard supra-umbilical transverse incision. Peritoneal cavity was full of bile and no bowel perforation was found but bile was coming down from right hypochondrium. Incision was extended vertically (Figure 1). Stomach,

duodenum and intestines were normal. Gall bladder was edematous. There was perforation of the bile duct at the junction of the CBD and cystic duct. Size of the perforation was about 3 mm on anterolateral wall (Figure 2) and the bile duct was not dilated. Bile duct was flushed with normal saline. There was debris inside bile duct but no true calculus. Cholecystectomy and peritoneal toilet was done. Margins of the perforation were friable and therefore no attempt was made to repair the perforation. Adventitious tissue over the perforation was apposed by a loose absorbable suture and a tube drain was placed near the perforation. Post operative recovery was smooth; initially the drainage tube drained 50 ml of bile daily for three days and gradually decreased and stopped on 9th post operative day. Ultrasonography showed normal biliary tree and no intra-abdominal collection. Drainage tube was removed on 10th postoperative day and the patient was discharged on 12th post operative day. Child has been well and jaundice free during follow up visits. Magnetic Resonance Cholangio-Pancretogram (MRCP) was done after 1 months and it showed normal pancreatico-biliary ducts and absent gall bladder.

Figure 1: Showing bile duct perforation on the antero-lateral wall.

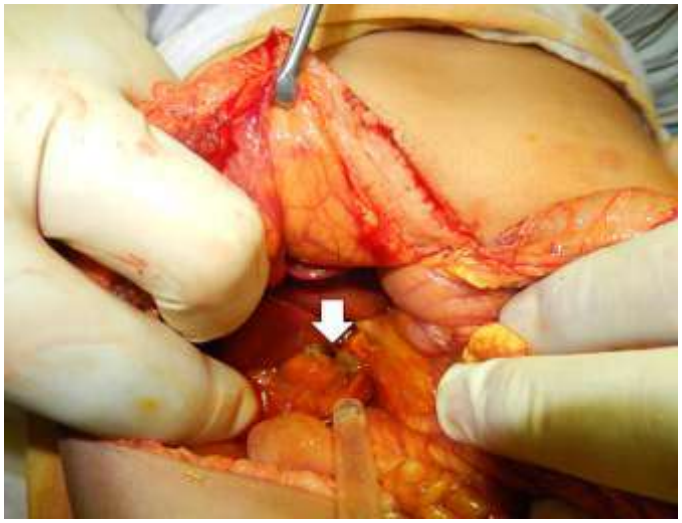

Figure 2: Patient in the post operative period

Case 2: An 11 years old girl presented with pain abdomen, vomiting, and fever for last two days. On examination there was moderate distension of abdomen with signs of generalized peritonitis. Ultrasonography showed peritoneal fluid with septations, bright omento-mesentery in right iliac fossa with probe tenderness; suggestive of appendicular pathology. Total count was 17200/cmm with 87% polymorphs, and hemoglobin of 13.4gm/dl. Serum amylase was 31 U/L and lipase 377 U/L, serum bilirubin was 1.9 mg/dl, AST 31 U/L and ALT 139 U/L. In view of generalized peritonitis laparotomy was done by a low transverse incision. There was copious bile inside peritoneal cavity. Appendix was apparently normal. Incision was extended towards epigastrium. There was bile collection in subhepatic space with debris. Bile was pouring out from the bile duct but perforation site could not be located accurately because of slough over the bile duct and cystic duct junction (Figure 3). Gall bladder was normally distended. Thorough wash out was done, tube drain was put in the subhepatic space near the perforation and tube (Foley catheter) cholecystostomy was done through liver parenchyma (Figure 4). Patient recovered uneventfully and drain output was scanty. Patient was discharged on 7th post operative day with cholecystostomy. Tube cholecystogram was done on 15th post opearative day, it showed normal biliary tree and free drainage of bile into duodenum (Figure 5). Foley catheter was clamped and removed after 5 days, there was no bile leakage. Patient has been well during 1 year follow up period.

Figure 3: Bile stain and debris over Calot's triangle

Figure 4: Cholecystostomy tube in situ

Figure 5: Post operative cholecystogram showing free flow of bile inti duodenum without leakage

DISCUSSION

Freeland reported the first case of spontaneous perforation of hepatic duct in 1882 diagnosed during autopsy. To date only 20 cases of intrahepatic and 50 cases of extrahepatic bile duct perforation have been reported. In the extrahepatic bile ducts, the CBD and cystic duct junction is the commonest sites of perforation, but this phenomenon has been described everywhere in the biliary tract [1]. In our first case perforation typically occurred at the junction of cystic duct and CBD. In second case perforation site could not be located accurately.

The etiological factors for spontaneous perforation of extrahepatic bile duct have been reported as follows: 1) erosion by biliary stones directly through the duct wall; 2) obstruction of the distal bile duct and increased intraductal pressure; 3) vascular thrombosis supplying the duct wall; 4) intramural infection of the duct as a result of cholangitis; 5) regurgitation of pancreatic secretions into the bile duct; 6) diverticulitis of the bile duct; and 7) carcinomas arising in the hepato-biliary-pancreatic organs. Combinations of these factors are probably responsible for most bile duct perforations. Congenital malfunction of the of the wall at the junction of the cystic duct and common bile duct has been implicated as causative factor for perforation of bile duct at this point, commonly encountered in infant and children[2].

Presentation of SPBD may be acute but more commonly insidious characterized by progressive jaundice, painless abdominal distension and clay stool. Presentation with overt peritonitis is rare because biliary peritonitis is usually a sterile chemical inflammation and hence may not create signs similar to bacterial peritonitis secondary to bowel perforation [3] and often the perforation is tiny and causes slow leakage of bile. Chardot et al [4] have reported a series of 11 cases of spontaneous perforation of bile duct of which 2 cases presented with generalized peritonitis, 4 cases with localized peritonitis and 5 cases with secondary biliary stenosis. Our first case initially presented with respiratory symptoms which may be concomitant or may be due to diaphragmatic irritation by bile and after sufficient bile collection abdominal symptoms became prominent. Second case presented with peritonitis similar to perforated appendicitis.

Because of non-specific clinical features, the diagnosis is rarely made preoperatively and most of the cases are diagnosed at laparotomy [3]. In our cases also initial diagnosis of perforation peritonitis was made and the final diagnosis was made during laparotomy.

When the diagnosis is suspected, hepatobiliary scintigraphy can provide useful information about liver function, biliary patency, and site of perforation based on localized accumulation of radiotracer in the peritoneal cavity. Delineation of Hepato-pancreatico-biliary anatomy is must in all cases if possible by intra-operative or post-operative cholangiogram or by ERCP/MRCP to detect ductal abnormalities and to rule out choledochal cyst to label it as a SPBD.

Recommended treatment for such cases is T-tube drainage of the common bile duct along with cholecystectomy. If preoperative or intraoperative cholangiogram is available and it shows no distal obstruction, primary repair may be considered. In cases with distal obstruction of the CBD, a biliary enteric bypass should be done but preferably be avoided in emergency situation because general condition of the patient is usually low and presence of inflammation can result in anastomotic leak. In our first case the bile duct was too narrow for insertion of a T-tube. We removed the gall bladder and simply drained the sub-hepatic space. In second case also Subhepatic space was drained as exploration of the bile duct seemed unsafe. Bile leakage subsided spontaneously and the post operative cholangiogram showed normal biliary tree. Therefore, we opine that in infants and small children with SPBD where bile duct is not dilated, simple external drainage of the perforation site is a safe temporary measure and it may be curative in absence of distal obstruction and unnecessary bypass operation may be avoided.

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CASE REPORT

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Transverse Testicular Ectopia : A Rare Anomaly

ABSTRACT

Transverse Testicular Ectopia (TTE)/ Crossed Testicular Ectopia (CTE) is a rare but well known congenital anomaly, in which both gonads migrate toward the same hemiscrotum. It is usually associated with other abnormalities such as persistent Mullerian duct syndrome, True Hermaphroditism, Inguinal Hernia, Hypospadias, Pseudohermaphroditism, and scrotal anomalies. We report a case of 3 year old male child with right inguinal hernia with suspicious right inguinal swelling and empty left scrotum. Diagnosis was confirmed preoperatively by ultrasound followed by Open Inguinal Exploration and Orchidopexy.

Keywords: Transverse testicular ectopia; Orchidopexy.

Introduction

Transverse Testicular Ectopia (TTE) is a rare congenital anomaly and is also referred to as testicular pseudo-duplication, unilateral double testis, and transverse aberrant testicle with mal-descent. Associated abnormalities may include persistent mullerian duct syndrome, true hermaphroditism, inguinal hernia, hypospadias, pseudo-hermaphroditism, and scrotal anomalies [1,2]. We report a case of TTE diagnosed pre-operatively and confirmed by Surgical Exploration followed by Repair.

Case Report

A 3 year old male child presented with complaints of right inguinal hernia and absent testis on left side. General examination and blood investigations were normal. On local genital examination, the left hemiscrotum was well developed but empty. A well developed right hemiscrotum with testes was seen. A single left inguinal swelling of 4x3 centimeter2 (cm2), with testicular sensation and cough impulse was present (Figure 1). Ultrasound confirmed the presence of the testes with one demonstrated in the right hemiscrotum and other at the right superficial inguinal ring. Left hemiscrotum was empty and no mullerian structures were seen on abdominal ultrasound. Open inguinal exploration showed right testis in right hemiscrotum and a small left testis with an accompanying fluid hernia in the right inguinal canal. Both testes had a common meso-orchium proximally and were separated by a distance of 4 cm (Figure 2). Herniotomy was performed and the lower right testis was placed in the left sub-dartos pouch by trans-septal approach and the left testis was placed in the right sub-dartos pouch. (Figures 3,4,5). Recovery was uneventful. The stitches were removed after 10 days and the wound was healthy. The patient was followed-up for a period of 6 months. There were no fresh complaints and the patient was enjoying a healthy life.

Figure 1: Clinical photo showing a swelling in the right inguinal area.

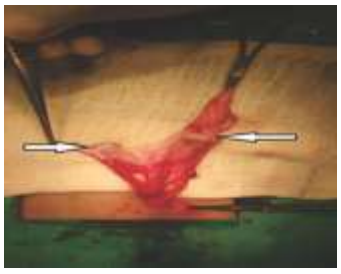
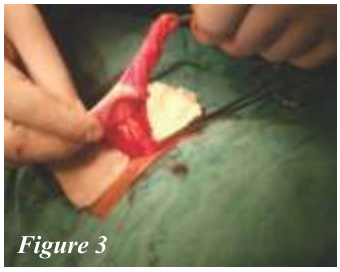
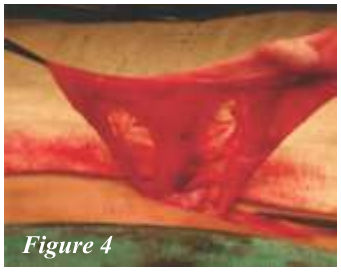


Figure 2: Intra-operative photo showing both the testes.





Figures 3,4,5: Intra-operative photos showing inguinal exploration being done, testes being explored indentified and atrans-septal orchidopexy being carried out.

Discussion

TTE is an uncommon anatomical abnormality where both the gonads migrate towards the same hemiscrotum. Approximately 100 cases have been reported in literature [1] and it was first described by Von Lennhosek [2]. Embryologically, several theories regarding the origin of TTE have been suggested including adhesion and fusion of developing Wolffian canals, aberrant gubernaculum, testicular adhesions, defective formation of the internal inguinal ring and traction on a testis by persistent mullerian structures. Persistent mullerian duct structures (PMDS) may result from the failure of synthesis or release of mullerian duct inhibitory factor (MIF), the failure of end organs to respond to MIF, or defect in the timing, of the release of MIF. It seems possible that the mechanical effect of the persistent mullerian duct structures prevents the testicular descent or leads to both testicles descending toward the same hemiscrotum producing TTE [3]. The association with cryptorchidism is accompanied by an increase in malignancy potential of crossed ectopic testes. The ectopic testis may lie in opposite hemiscrotum, in the inguinal canal or at the deep inguinal ring. An inguinal hernia is invariably present on the side to which the ectopic testis is migrated. On the basis of the presence of various associated anomalies, TTE has been classified into 3 types [4]:

Type 1- accompanied only by hernia (40% to 50%)

Type 2- accompanied by persistent or rudimentary mullerian duct structures (30%)

Type 3- associated with disorders other than persistent mullerian remnants (hypospadias, pseudohermaphroditism, and scrotal abnormalities) (20%).

The mean age at presentation is 4 years and the clinical presentation generally includes an inguinal hernia on one side and a contra lateral or sometimes a bilateral cryptorchidism [5,6]. Usually, the correct diagnosis cannot be made before surgical exploration.The diagnosis of TTE can be made preoperatively by close clinical examination and use of ultrasonography by an experienced sonographer [7]. Patients with TTE are at increased risk of malignant transformation with the overall incidence of malignant transformation of gonads approximately 18% [8]. There have also been reports of associated embryonal carcinoma [9], seminoma, yolk sac tumor [10], and teratoma [8]. Walsh et al. [11] concluded that testicular cancer was nearly 6 times more likely to develop in cryptorchid cases where operations were delayed until after 10 to 11 years of age. Wood et al. [12] showed that risk of malignancy in undescended testicles decreased if orchiopexy performed before ages 10 to 12 years. In patients with TTE, disorders of urinary tract system have also been reported [13].

Once diagnosis of TTE is made, orchidopexy is recommended for the preservation of fertility [6]. Laparoscopy is useful for both diagnosis and treatment of TTE and associated anomalies [14]. Management for testicular ectopia is either transseptal or extra-peritoneal transposition orchidopexy [15,16], a search for mullerian remnants or other anomalies, and a longterm postoperative follow-up. In the extra-peritoneal technique the testis is brought to the contra-lateral hemiscrotum crossing the root of penis. In the trans-septal technique the testis should traverse the scrotal mediastinum (septum) to be fixed in it. TTE may also be misdiagnosed as an inguinal hernia, intersex [14], or present as an irreducible hernia requiring urgent surgery [17]. TTE associated with fused vas deferens is extremely rare. This condition may hinder the testis from being placed into the scrotum during orchidopexy [18]. In cases of fused vas deferens, a trans-septal orchidopexy is recommended.

Conclusion

TTE is a rare anomaly whose pathogenesis remains unclear. The diagnosis should be considered when unilateral hernia and concurrent cryptorchidism of the contralateral side are present. In suspected cases, ultrasonographic evaluation and laparoscopy may be helpful in diagnosing this condition before surgery. Trans-septal Orchidopexy is recommended to manage TTE. Laparoscopy may be useful for both diagnosis.

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