EVALUATION OF CLINICAL SUCCESS AND OUTCOMES IN MANAGEMENT OF PERIPANCREATIC HAEMORRHAGE

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ABSTRACT

BACKGROUND

Peripancreatic haemorrhage though rare, has lethal outcomes. This rare scenario is a consequence of pancreatic diseases per se as well as surgical complication of pancreatobiliary surgery. The aim of this study is to present the retrospective analysis of our experience on the common aetiologies, clinical presentations and various approaches for the management of Peripancreatic haemorrhage.

MATERIALS AND METHODS

We present our retrospectively analysed data from prospectively maintained database during the period 2014 -2018. In the 4 year period, 29 patients were diagnosed with Peripancreatic haemorrhage. 25 of these 29 patients were diagnosed with pancreatitis being the cause. 2 patients in this pancreatitis group presented with Peripancreatic haemorrhage during the post-operative course of pancreatic necrosectomy. 3 patients presented with early Grade C post-pancreatoduodenectomy haemorrhage, 1 patient presented with peripancreatic haemorrhage 1 month following pancreatoduodenectomy procedure. Peripancreatic haemostasis was attempted with endovascular angioembolisation in 26 cases, 3 cases underwent surgical haemostasis and 1 patient was attempted surgical haemostasis after failed endovascular haemostasis. The decision whether the patient first undergoes endovascular or surgical haemostasis was based on the patient's clinical condition and on the availability of interventional radiologist during the emergency. The outcomes measured were clinical successful haemostasis and post interventional complications.

RESULTS

Conventional CT Angiogram could localise the site of bleed in 23 of 26 (88.46%) cases. Endovascular angiography was successful in localising the site of bleed in 24 of 26 (92.31%) cases. Primary endovascular angioembolisation was successful in controlling the Peripancreatic bleed in 22 cases (91.66%). Repeat endovascular angiography and blind angioembolisation was done in 2 cases based on the CT and endoscopic assessment of the possible site of bleed of which it was successful in both. In 1 patient, there was failure to cannulate the splenic artery. 1 patient suffered superior mesenteric arterial dissection and 1 patients suffered right groin hematoma at the femoral artery puncture site. All 3 early post – pancreatoduodenectomy haemorrhage patients underwent emergency re-exploration and surgical haemostasis was attained in 2 cases. Identified source of Peripancreatic haemorrhage include gastroduodenal artery in (7), splenic artery (15), inferior pancreatoduodenal artery in (3), superior mesenteric artery branches (2) and unnamed tuft of vessels in peri pancreatic region (2). Clinical success with endovascular angioembolisation alone (92.31 %) and attempted surgical haemostasis (50%). Overall mortality was 6.89% (2/29).

CONCLUSION

Peripancreatic haemorrhage though uncommon is known for high morbidity and mortality. The goal of management after initial resuscitation in a hemodynamically stable patients should be conventional angiography and angioembolisation. Surgical haemostasis is not to be ignored for its complimentary role and should be reserved for haemodynamically unstable patients and those who fail endovascular haemostasis.

KEYWORDS

Peri pancreatic haemorrhage, angio-embolisation, pseudoaneurysm.

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BACKGROUND

Peripancreatic haemorrhage has an incidence between 1.2-14.5% in patients with pancreatitis and 1-8% in post pancreatectomy respectively.[1,2] Although it has apparently low incidence, the mortality is significant to the tune of 11-38% in post pancreatectomy patients.[2] The mortality because of haemorrhagic complication in patients with acute pancreatitis is alarming and in between 34-54%.[3] The management of this condition is complex because of sudden and torrential nature of bleeding.

Both acute and chronic pancreatitis are known to be complicated with formation of pseudo aneurysms and bleed. The pancreatic and peri-pancreatic inflammation, the digestive enzymes of the pancreas along with the pressure effect of the pseudocysts predispose the peri-pancreatic arcades to torrential bleed. Post pancreatectomy haemorrhage has been known to be the result of pancreatic anastomotic failure leading to leakage of pancreatic enzymes and as well post-operative collections and associated infective complications.

Amplifying advances in body imaging and endovascular imaging and interventions have made a tremendous impact in identifying and managing Peripancreatic haemorrhage. In spite of these advances, controlling a Peripancreatic bleed may be challenging because of the variations in the pancreatic arcades and also highly variable collateral pathways between celiac and superior mesenteric arteries.[4]

At present the best modality of assessing a hemodynamically stable patient with Peripancreatic haemorrhage is CT angiogram.[5] In most of the cases this provides an accurate diagnosis and when combined with conventional angiogram, embolization of the feeding vessel or the pseudo aneurysm itself can be attempted.

Endovascular haemostasis by selective embolization was popularised by Rosch et al[6] and this gradually became an alternative to conventional open surgical approach in the management of gastrointestinal bleeding.

Until now no evidence based guidelines exist regarding the optimal management of Peripancreatic haemorrhage. Authors in favour of surgical intervention put forth the argument that the diseased pancreas is not cured by angioembolisation and would predispose to further episodes of haemorrhage as the disease process progresses.[7] The authors in favour of the endovascular interventions put forth the technical success rate 67-97% of angioembolisation[8] and associated higher morbidity and mortality in hemodynamically unstable patients undergoing surgical haemostasis.

In this study we intend to describe our experience on Peripancreatic haemorrhage, its predisposing factors, management and the outcomes.

MATERIALS AND METHODS

Between august 2014 to April 2018, 29 patients presented to department of surgical gastroenterology & liver transplantation, Bangalore medical college & Research Institute. Our institute is a referral hospital for whole of the state of Karnataka and we deal with advanced endoscopy, laparoscopic hepatobiliary and colorectal surgeries and liver transplantation.

A retrospective analysis was conducted on the hospital database and the patients presenting with Peripancreatic haemorrhage were identified. The case records were reviewed in detail regarding the clinical history, clinical presentation, examination findings, endoscopic details, CT films and findings, conventional angiography sequences and procedures, clinical outcomes. The data was compiled and analysed.

Patient Characteristics

The average age of the study population was 35.86 years. The male to female ratio was 27:2. There were 25(86.20%) patients with pancreatitis related and 4(13.79%) with pancreatic resection related haemorrhage.

Disease Characteristics in the Pancreatitis Group (n = 25)

	n= 25
Sex Males Females Age (in years)	 25 35.84 yrs. (average)
Aetiology Alcohol Gall stone Tumour	 21 (84%) 3 (12%) 1 (2%)
Acute Pancreatitis AP + PPC +PA	3 (12%) 3
Chronic Pancreatitis CP + PPC + PA CP + PPC CP + Left side Portal hypertension	18 (72%) 15 2 1
Acute Necrotising Pancreatitis	2
Post Necrosectomy Patients	2

Table 1. Disease Characteristics in Pancreatitis Group

AP- acute pancreatitis, CP – chronic pancreatitis, PPC – pancreatic pseudo cyst, PA- pseudo aneurysm

Among the study population in the pancreatitis group, acute pancreatitis was diagnosed in 5 (20%), chronic pancreatitis 18 (72%) and 2 (8%) patients post necrosectomy were identified with Peripancreatic haemorrhage. Alcohol was the causative factor identified in 21/25 (84%) of our subjects as the etiological factor for

pancreatitis, tumour induced in 1 subject and biliary aetiology in 3. Pseudo pancreatic cysts were associated in 18 (72%) of the pancreatitis patients. Pain abdomen was the chief presenting complaint in 13 (52%) of the patients, gastrointestinal haemorrhage was present in 11(44%) and 1 patient post necrosectomy presented with bleeding into the Peripancreatic drain. Endoscopic examination could identify haemosuccus pancreaticus in 3 patients, and 5 were diagnosed with fundal varices without active/ recent signs of bleed. CT angiogram identified pseudo aneurysm of Peripancreatic visceral artery in 21 (84%) patients.

Disease Characteristics in the Pancreatic Resection Group (n=4)

Four patients with Peripancreatic haemorrhage were identified in this group. All 4 were post Whipple's pancreatic resection patients. 3 patients were diagnosed with early Grade C post pancreatectomy haemorrhage and presented with bleed into the Peripancreatic drain. Due to haemodynamic instability and non-availability of emergency interventional radiologist, all the above 3 underwent emergency re exploration and surgical haemostasis attained. 1 patient presented with melena on post-operative day 30, both CT angiography and conventional angiogram could not identify the site of bleed in this patient.

	n= 4
Sex	
Males	2
Females	2
Diagnosis	
Pancreatic head adenocarcinoma	1
Ampullary adenocarcinoma	1
Distal CBD Cholangiocarcinoma	1
SPEN of head of pancreas	1

Table 2. Disease Characteristics of Pancreatic Resection Group

CT Angiography

CT was performed with 64 slice MDCT. As per the body weight of the patient, the intravenous contrast was pushed at flow rate of 3 -4 ml/second and bolus tracking was done. All of the patients were given negative oral contrast to avoid interference with 3D reconstruction. The images of arterial and venous phases were acquired at 25-35 seconds and 50-65 seconds respectively. In our series CT angiogram could identify the source of bleed in 21/26 (80.76%), in 2 (7.69%) patients suspicious retrogastric and Peripancreatic tuft of vessels were identified, in 3 (11.53%) patients only bleed into pseudo cyst without a known source was identified.

Endovascular Angiography and Angioembolisation Techniques

Under local anaesthesia 26 patients underwent catheter angiography through right common femoral artery using Seldinger's technique with 5F sheath (Terumo, Japan) in our angiography suite. Cobra shaped catheter 4-5F was used for selective catheterisation of the celiac axis and superior mesenteric artery. Angiography identified the site of possible bleed in 24/26 (92.31%) patients. Target Angioembolisation was done in all 24 patients and 2 patients underwent blind embolization based on CT angiography findings. Angioembolisation was done using Progreat micro catheter (Terumo, Japan). Most common embolising agent used was platinum micro coils (Micronester, Cook medical, USA) twenty five (25) patients, in 1 patient we used a combination of isobutyl cyanoacrylate glue and platinum coils. Transcatheter coil delivery to the target site was achieved with saline injection. Post embolization, the technical success was documented with absence of flow in the feeding vessel. All the patients were monitored for puncture site haematoma, abdominal signs of peritonitis. Post procedure the patients were assessed for Clinical success defined as haemodynamic stability and no further drop in the Haemoglobin and absence of need for further blood transfusion. We define failure as inability to attain haemostasis following the current embolisations in this hospital admission. We did not repeat any further confirmatory angiograms in patients with clinical success attained. Mortality was defined as the deaths occurring during the admission or within 30 days of follow up.

RESULTS

The major cause for Peripancreatic haemorrhage was pancreatitis 25/29 (86.21%), chronic pancreatitis dominated the types, 72% of vascular complications seen in it. The most common bleeding source identified on CT angiogram and Endovascular angiogram combined were splenic artery branches 15(62.5%) and others were Gastroduodenal artery 7(29.1%), inferior pancreatoduodenal artery 2(8.33%).

Therapeutic embolization was successful in 24/26 (92.31%) patients. 2 among these were blind embolisations based on CT appearance. In 1 patient there was failure to cannulate the splenic artery and hence he underwent surgical haemostasis. In 1 patient, a case of post op day 30 post Whipple's resection continued to have GI bleed in spite of angioembolisation he was later taken up for surgical haemostasis. We had 2 complications in the angioembolisation group. 1 patient had dissection at SMA origin, 1 patient developed a right groin haematoma. Both the patients were observed and their recovery was uneventful.

	n=26
Angioembolisations	
Target	22
Blind	2
Angioembolisation Failure	
Technical	1
Clinical	1
Clinical Successful Angioembolisation	24(92.3%)

Table 3. Results-Endovascular Angioembolisation

Emergency surgical haemostasis was attempted in 3 patients. All were early Grade C PPH following Whipple's procedure for suspected pancreatic head malignancy. The

bleeding sources identified were small unnamed branches in the pancreatic resection margin in 2 patients. And small twigs on SMA in 1 patient.

There were 2 mortalities. One due to early Grade C PPH in a post Whipple's resection patient who underwent emergency re-exploration twice on post op day 2 & 3 and had failed surgical haemostasis. The second was a post op day 30 Post Whipple's resection who presented with melena, had failed CT and angiographic identification of the bleed, and ultimately taken up for surgical haemostasis which failed.

Total patients undergoing surgical haemostasis	5
Primary Surgical haemostasis	
Success	2
Failure	1
Attempted surgical haemostasis after failure of angioembolisation	
Success	1
Failure	1

Table 4. Results of Surgical Haemostasis

DISCUSSION

Peripancreatic haemorrhage has an incidence between 1.2 - 14.5% in patients with pancreatitis and 1-8% in post pancreatectomy respectively.[1,2] The most common Etiological association for pancreatitis noted was with alcohol (84%) in our series.

The incidence of vascular complications in the chronic pancreatitis is higher 7 -10% compared to acute pancreatitis 1-6%.[9] The cause for vascular complications in pancreatitis has been proposed to be proteolytic enzymatic destruction on the vessel wall by Trypsin and Elastase, usually as a consequence of Peripancreatic dissemination of these enzymes after an attack of pancreatitis. Haemorrhage can occur into the pancreatic parenchyma, peritoneal cavity or into the gastrointestinal tract.[10]

The sensitivity of CT angiogram to detect the source of bleed in our series was 80.76% and as per the current literature evidence it is 90%.[11] The success rate of angioembolisation in our series was 92.31%. The success rates across recent literature 95-97%. This higher success rate of angioembolisation is the reason for it being advocated as first line therapy in management of Peripancreatic bleed in pseudo aneurysms.[12]

The appropriate patient for angioembolisation is a hemodynamically stable patient. Variety of embolising agents are available like platinum coils, poly vinyl alcohol particles, cyanoacrylate glue. These mentioned embolising agents are also used in various combinations with variable success rates.[13]

The importance of sentinel bleed as emphasised by Sato et al cannot be ignored.[14] Surgical management is advocated when the patient is haemodynamically unstable, non-availability of interventional radiologist and failure of angioembolisation. Surgical management needs expertise because the bleeding vessel usually lies deep in the pseudocysts cavity, severe pancreatic tissue friability due to inflammation adds on to the complexity.[15] Many a times it's impossible to isolate and securely ligate the artery proximally. The option left in these patients is some kind of pancreatic resectional procedure depending on the site of bleed. If the bleed is in the pancreatic head region, the patient might need Whipple's resection and if in the body and tail region, distal pancreatectomy might be needed. Such major resections in a patient who is already haemodynamically unstable are fraught with mortality as high as 43% for pancreatic head resections and 16% for body and tail resections.[16]

Surgical haemostasis and angioembolisation are always complimentary. In the background of a negative endovascular angiography, in a haemodynamically stable patient blind angioembolisation can be attempted based on CT angiography findings. The common complications associated with catheter angioembolisation are – puncture site haematoma, arterial dissection, non -target embolization, bowel gangrene, peritonitis and rarely mortality consequent to this.

Yekebes et al[17] from their retrospective analysis of 1669 pancreatic resections have recommended that intravascular angiography should be the first diagnostic and therapeutic tool for patients presenting with late post pancreatectomy haemorrhage with a success rate of 80%.

CONCLUSION

Peripancreatic Haemorrhage is a known complication of pancreatitis and following pancreatic resectional procedures. Albeit its rarity, it is associated with high mortality. In a haemodynamically stable patient, endovascular angiogram and angioembolisation should be the first line of management irrespective of early or late presentation.

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