

USG IS A POOR TOOL IN IDENTIFICATION OF PANCREATIC INJURY:– A CASE REPORT**Dr. Abhaykumar B. Dheeraj*¹, Dr. Krishnadutt H. Chavali², Dr. Pankaj S. Ghormade³, Dr. Bedanta Sarma⁴,
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ABSTRACT

In blunt abdominal trauma most commonly involved solid organs are liver and spleen.^[1] Pancreas injured only in 5% cases of all blunt trauma injury to abdomen whereas in 20-30% cases of penetrating trauma with morbidity in 30-60% cases and mortality in 10-30% cases.^[3,4] Most commonly head and body of pancreas get injured in approximately 65% of pancreatic lesions; neck and tail contributes for the rest.^[6] In the present case, a young adult came to a Tertiary care center with blunt trauma over the abdomen, hip and lower limbs following road traffic accident. Two consecutive abdominal USG investigations including FAST done failed to diagnose pancreatic injury during first week of hospital stay. It was diagnosed much later and operated but the patient succumbed due to septicemic shock probably due to a delayed diagnosis. Due to relatively high mortality associated with pancreatic injuries, though their incidence is low, it is suggested that in cases of BTA, a serum amylase and lipase level should be done for early diagnosis and better outcome of such cases.

KEYWORDS: Pancreas, Retroperitoneum, Blunt Trauma abdomen, Serum Amylase, Serum Lipase.**INTRODUCTION**

In cases of blunt trauma to abdomen most commonly injury is sustained to organ like liver and spleen. Laceration of pancreas is reported at times, amounting to about 5% of all blunt trauma injury to abdomen cases. The most accepted mechanism appears to be related to the compression of the organ against the vertebral column during the impact.^[1,2] The rate of morbidity is 30-60%, while mortality is 10-30% in cases of pancreatic trauma.^[3,4]

Retroperitoneal situation of pancreas provides it with a natural protection from blunt abdominal traumas as compared to liver or spleen. Though trauma to the

intraperitoneal organs is readily appreciated, pancreatic trauma is not recognized immediately due to its retroperitoneal location, causing a higher rate of mortality and morbidity. Pancreatic injury is more common in penetrating trauma as compared to blunt one.

The American Association of Surgery and Trauma (AAST) has classified pancreatic trauma into five grades according to presence of hematoma, laceration, site of lesion and the integrity of the pancreatic duct and its complications.^[5] Due to its anatomical location and vascular sharing with pancreas, the duodenum is the most commonly involved structure in pancreatic trauma.^[3,6,7,8]

Table 1.

American Association for the Surgery of Trauma (AAST) Scale for Pancreatic Injury.		
I	Hematoma Laceration	Minor contusion without duct damage. Superficial laceration without duct damage.
II	Hematoma Laceration	Major contusion without duct damage or loss of tissue. Major laceration without duct damage or loss of tissue.
III	Laceration	Distal division or parenchymal damage with duct injury.
IV	Laceration	Proximal division or parenchymal damage affecting the ampulla of Vater.
V	Laceration	Massive disruption of the head of the pancreas.

CASE

A 24 year old young male was brought to the tertiary care hospital in Raipur, Chhattisgarh, India with complaint of pain over his right hand, right hip and right leg since one day following a road traffic accident. He showed normal vitals at admission.

Radiographs showed acetabular fracture with dislocation of right hip and open fracture of right tibia and fibula. Preoperative laboratory investigations including abdominal ultrasound examination revealed no abnormality. Closed reduction of hip and leg was done day after the admission. Four days later he developed abdominal distension and difficulty in passing stool. Repeat USG again was negative with respect to solid organs. However, distended bowel loops were seen with minimal peritoneal fluid.

Two days later CECT abdomen was done, which showed complete transection at the level of neck of pancreas with

large fluid collection in peri-splenic and peri-pancreatic region. Exploratory Laparotomy was performed with drainage of pancreatic bed, on the next day. The drains were reported to be functional.

Repeat CECT showed multiple loculated collections in retroperitoneal perisplenic area with no dilatation of pancreatic duct, minimal pelvic collection and vascular pancreatic body remnant. Patient succumbed after being on treatment for almost a month due to septicemia. Being a medicolegal case the body was subjected to medicolegal postmortem examination.

On autopsy following important findings were observed: Peritoneum was adherent to underlying omentum, small bowel and colon with multiple sites on the mesentry showing yellowish white foul smelling purulent material. Pancreas was found in pieces with head, body and tail in separate pieces. Cause of death in this case was opined as septicaemic shock.

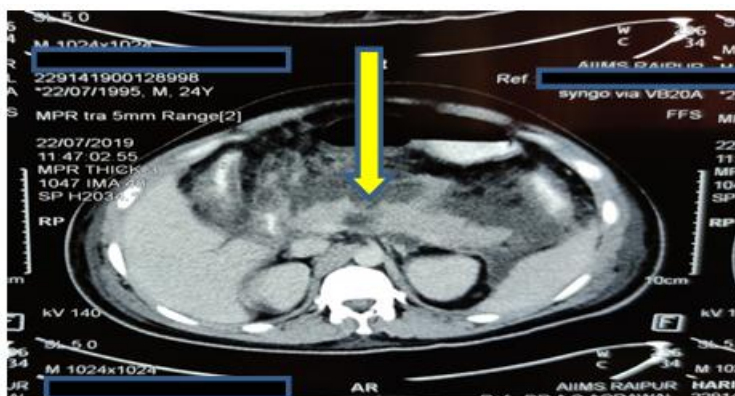


Figure 1: Figure showing transection of neck of pancreas (arrow mark) on CECT.

DISCUSSION

Pancreas is J-shaped, soft, lobulated retroperitoneal organ. It lies at the level of L1-2 spine. The main pancreatic duct of Wirsung traverses the entire length of the gland. The proximity of many larger vessels such as IVC, portal vein and abdominal aorta makes injuries to the pancreas difficult to manage. The head being surrounded by the duodenum on three sides makes it more difficult to handle as compared to body and tail.

Injuries to the pancreas are more common in penetrating trauma than blunt trauma. 20-30% pancreatic injuries are due to penetrating trauma, whereas only 5% is due to the blunt abdominal trauma.^[1,2] Blunt trauma is because of localized high impact force on pancreas against vertebral column. It is commoner in young adult and children as compared to older adults, because they have thinner or absent mantle of protective fat surrounding the pancreas.

Most commonly injury is sustained to organ like liver, spleen in cases of blunt trauma to abdomen. Approximately 65% of pancreatic lesions occurs in the head and body while the remaining ones take place at the

neck and tail.^[6] In this case, the transection of the neck of pancreas was noted on CECT.

Most commonly advised bedside investigation in cases of blunt trauma abdomen is FAST (Focused Assessment with Sonography). For the detection of free intraperitoneal fluid and hematomas, ultrasonography is considered useful, but it is having very limited use in detecting the injury of the pancreas due to its retroperitoneal location. In the present case also, the initial USG examination did not reveal any abnormality of the pancreas or any fluid collected surrounding it. Again nothing significant was found when it was repeated once the patient developed abdominal distension.

Rise in the level of serum amylase and lipase is also used in detecting pathology related to pancreas. The rise in serum amylase level is due the damage to tissues containing the enzyme. The rise of amylase level is seen in pancreatitis, cholecystitis, and salivary gland infection.^[9,10]

It is because of the intraluminal pancreatic enzyme released from the tissue, which enters via the gut submucosa into the mesenteric lymph or venous circulation leading to elevation in the serum amylase levels.^[11,12]

It is considered that the elevation of amylase level 3 hours after the trauma indicates pancreatic damage.^[17,18] It is also advocated that the raised amylase level after blunt pancreatic trauma is time dependent, and a persistently elevated or rising level is more reliable indicator of pancreatic trauma, but does not indicate the severity of the injury.^[19]

The level of serum amylase and lipase in this case was noted to be 477 and 283 IU/L after the USG was unable to detect any abnormality to distended abdomen. Earlier studies have proved the role of amylase and lipase estimation as a screening diagnostic tool for detection of acute pancreatitis. However, sparse literature is available on the role of amylase and lipase levels in serum and urine to help predict specific intra-abdominal extra-pancreatic injuries after blunt trauma to abdomen.

Computed tomography (CT) is currently the best modality to diagnose pancreatic trauma. It has sensitivity of 60-85%.^[3,6] If the diagnosis is still unclear, magnetic resonance cholangio-pancreatography (MRCP) is an alternative diagnostic method. It is also superior than endoscopic retrograde cholangiopancreatography (ERCP).^[6,8] None of these three were done prior to detection of injury in the present case.

The basis for assessing the morbidity and mortality in cases of pancreatic trauma is the integrity of pancreatic duct, and so is for deciding the treatment. Surgery should be performed promptly with the diagnosis of disruption of pancreatic duct. Surgical treatment depends of the localization of trauma, grade of pancreatic duct disruption and AAST level. There is doubling in rate of morbidity with a delay of 24 hours.^[13,14,15]

An isolated pancreatic injury may be missed or the diagnosis may be delayed because the initial symptoms and signs of pancreatic injury are subtle, and this may contribute to the morbidity and mortality associated with this injury. In the present case also the diagnosis was made after 09 days of admission. Such a delay could have been the reason for mortality in this case.

Serum amylase level was noted to be elevated in 82% cases, in a review of 400 cases of pancreatic injury conducted by Bradley. Because elevated amylase level has been observed in large number of proven pancreatic injury, it should at least be considered a sign of probable pancreatic injury in the setting of blunt abdominal trauma and should indicate the need for further testing.^[16]

CONCLUSION

In most of cases of blunt trauma abdomen FAST is the first preferred investigation but it may not be useful in injuries to retroperitoneal organs. The chances of pancreatic trauma in blunt abdomen injury are low but mortality is high. Hence, if FAST is combined with Serum amylase and lipase level, where initial USG fails to identify any sort of pancreatic injury, early detection of pancreatic trauma can be done and can reduce mortality to a large extent. As compared to availability and cost of CECT, which is considered as next modality to diagnose pancreatic injury, combination of USG with Sr. Amylase and Lipase can prove to be of greater, simpler and cost effective mean.

BIBLIOGRAPHY

1. Tsai MT, Sun JT, Tsai KC, Lien WC (2010) Isolated traumatic pancreatic rupture. *Am J Emerg Med*, 28: 745-746.
2. Fisher M, Brasel K (2011) Evolving management of pancreatic injury. *Curr Opin Crit Care*, 17: 613-617.
3. Oteiza F, Diaz de Liaño A, Ciga MA, Ortiz H (2003) Rotura pancreática aislada diagnosticada por TC en un traumatismo cerrado. *Cir Esp.*, 74: 296- 298.
4. Kreis ME, Albertsmeier M, Graser A, Krenz D, Jauch KW, et al. (2011) Novel surgical technique for complete traumatic rupture of the pancreas: A case report. *J Med Case Rep.*, 5: 456.
5. Moore EE, Moore FA (2010) American Association for the Surgery of Trauma Organ Injury Scaling: 50th anniversary review article of the *Journal of Trauma*. *J Trauma*, 69: 1600-1601.
6. Holalkere NS, Soto J (2012) Imaging of miscellaneous pancreatic pathology (trauma, transplant, infections and deposition). *Radiol Clin N Am*, 50: 515-528.
7. Peitzman AB, Richardson JD (2010) Surgical treatment of injuries to the solid abdominal organs: a 50-year perspective from the *Journal of Trauma*. *J Trauma*, 69: 1011-1021.
8. Govaert MJ, Ponsen KJ, de Jonge L, de Wit LT, Obertop H (2001) Fracture of the pancreas in two patients after a go-kart accident. *HPB Oxford*, 3: 3-6.
9. Tietz NW. Support of the diagnosis of pancreatitis by enzyme tests-old problems, new technique. *Clin Chim Acta*, 1997; 257: 85-98.
10. Gumaste VV, Roditid N, Mehta D, Dave PB. Serum lipase levels in non pancreatic abdominal pain versus acute pancreatitis. *AmJ Gastroenterol*, 1993; 88: 2051-5.
11. Schmid-Schoenbein GW, Hugli TE. A new hypothesis for microvascular inflammation in shock and multiorgan failure: Self-digestion by pancreatic enzymes. *Microcirculation*, 2005; 12: 71-82.
12. Malinoski DJ, Hadjizacharia P, Salim A, Kim H, Dolich MO, Cinat M, *et al.* Elevated serum pancreatic enzyme levels after hemorrhagic shock

- predict organ failure and death. *J Trauma*, 2009; 67: 445-9.
13. Oteiza F, Diaz de Liaño A, Ciga MA, Ortiz H (2003) Rotura pancreática aislada diagnosticada por TC en un traumatismo cerrado. *Cir Esp*, 74: 296-298.
 14. Holalkere NS, Soto J (2012) Imaging of miscellaneous pancreatic pathology (trauma, transplant, infections and deposition). *Radiol Clin N Am*, 50: 515-528.
 15. Kreis ME, Albertsmeier M, Graser A, Krenz D, Jauch KW, et al. (2011) Novel surgical technique for complete traumatic rupture of the pancreas: A case report. *J Med Case Rep*, 5: 456.
 16. Frank B, Gottlieb K. Amylase normal, lipase elevated: Is it pancreatitis? A case series and review of the literature. *Am J Gastroenterol*, 1999; 94: 463-9.
 17. Subramanian A, Dente CJ, Feliciano DV. The management of pancreatic trauma in the modern era. *Surg Clin N Am.*, 2007; 87: 1515–32.
 18. Negoï I, Paun S, Stoica B, Tanase I, Hostiuç S, Beuran M. High grade penetrating pancreatic trauma – case report and review of the literature. *Chirurgia (Bucur)*, 2015; 110: 554–8.
 19. Ilahi O, Bochicchio GV, Scalea TM. Efficacy of computed tomography in the diagnosis of pancreatic injury in adult blunt trauma patients: a single-institutional study. *Am Surg*, 2002; 68: 704-77; discussion 704-77 [PMID: 12206605]