Case Report

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Pancreaticoduodenectomy for paediatric pancreatic trauma with a decade of follow-up

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SUMMARY

Pancreaticoduodenal injuries are rare in children. They pose challenges for the treating surgeon in decision making with respect to diagnosis, surgical and post-surgical management. The management plan must be tailored to the nature and severity of trauma, patient profile, surgeon's expertise and the resources available at surgeon's disposal. We describe a pancreaticoduodenal injury in 3-year-old child with successful outcome and follow-up of a decade.

Key words: Blunt trauma abdomen, pancreaticoduodenectomy, pancreatic trauma, paediatric

INTRODUCTION

Pancreatic injury is rare in children and pancreatic ductal injury is even rarer. This organ lies in a protected position within the retroperitoneum along with duodenum. Though this peculiar position bestows protection to the organ it poses peculiar challenges to the treating surgeon. We describe a case of pancreaticoduodenal injury in a young child with a strange mode of injury. The case report also highlights uneventful clinical course of the child for virtually a decade.

CASE REPORT

This was a case report of a 3-year-old female child sustained blunt injuries over the abdomen, chest and head due to a fall of heavy wooden cupboard over her body while she was lying on the floor. She was first admitted to a paediatric intensive care unit at a local hospital, where she had 4-5 episodes of vomiting stained with a few drops of blood. She had also developed respiratory distress by then but her chest radiograph was normal. With screening Haemoglobin levels of 10.5 g/dl, her ultrasonography of the abdomen revealed minimal free fluid in Morrison's pouch. She was drowsy but arousable and maintained her vital parameters. There was vague abdominal tenderness. Next day, by the morning she developed abdominal distension with exquisite tenderness over right hypochondrium associated with guarding. Ecchymosis was evident over the same region. Non-contrast computed tomography of the brain showed a small frontal hematoma with mild cerebral oedema. Her general condition further deteriorated in next 2 h so she was referred to our hospital.

The child had severe pallor, tachycardia (170 bpm), thready pulse and severe hypothermia. She was drowsy and oliguric. Grey Turner's sign was evident over her distended abdomen. Digital rectal examination did not reveal anything abnormal.

After initial fluid resuscitation, radiographs of abdomen in erect (antero-posterior and lateral) position were carried out. These radiographs revealed various radiological signs of pneumoperitoneum and pneumo-retroperitoneum [Figures 1 and 2]. The clinical findings, radiographic investigations and corroborative history were highly suggestive of a pancreaticoduodenal injury.

At laparotomy, a completely transected pancreatic neck, devitalized duodenum and choledochus with pancreatic ductal transection due to avulsion of pancreatic head was noted. Overlying transverse colon was also contused with subsequent devitalisation [Figure 3]. A decision to perform pylorus preserving pancreaticoduodenectomy was taken in view of the

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massive nature of injury. The lower end of transected bile duct was ligated. The pylorus was preserved and pylorojejunostomy with Roux en Y jejunal loop was done. Roux en Y cholecystojejunostomy and pancreaticojejunostomy were done [Figure 3]. In order to aid post-operative nutritional access, a feeding jejunostomy was added distal to this triple anastomosis. A short segment of devitalised colon was excised and a colo-colic anastomosis was carried out.

The patient was off ventilator on fourth post-operative day. Jejunostomy feeds in the form of clear liquids were initiated on 3rd post-operative day and escalated to full feeds by 5th post-operative day. Child had a single spike of fever on 7th post-operative day. An abdominal ultrasonography revealed a collection which was completely aspirated. The aspirate was greenish in colour suggesting a biloma. On 12th day after surgery, bile revealed itself through the main incision but it reduced by 17th post-operative day and completely stopped 5 days after. Full oral diet was started on 14th day after surgery as jejunostomy tube was accidentally removed.

The early post-operative period was absolutely uneventful. Virtually for a decade, she remains to be completely asymptomatic with no growth problems, cholangitis or jaundice. Magnetic resonance pancreaticojejunostomy done at 9 years follow-up showed a patent cholecystojejunal anastomosis and pancreatic duct could be visualised properly [Figure 4].

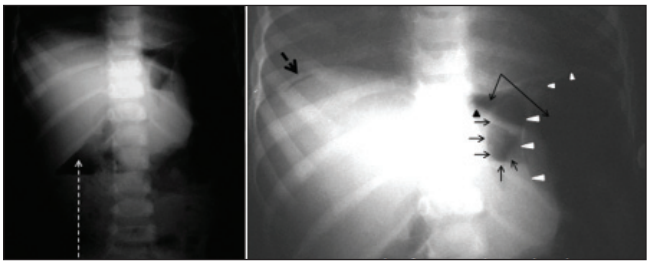


Figure 1: Radiographs depicting anterior sub-hepatic gas (dashed white arrow), rim of gas under right hemidiaphragm (dashed black arrow), gas in lesser sac (small black arrows), Cupola sign-gas under central tendon (solid black arrow) and double bubble sign (solid white arrows)

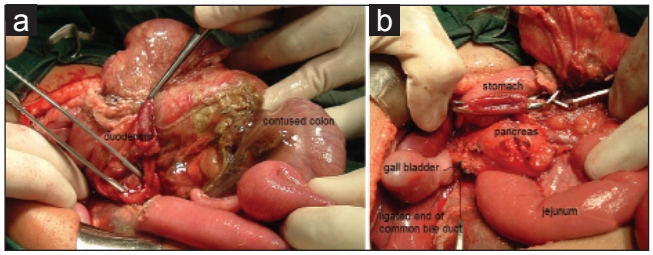


Figure 3: Pancreaticoduodenectomy - Pre-resection image showing torn duodenum and contused colon (a) and post-resection images depicting ligated common bile duct, transected pancreas and pylorus (b)

DISCUSSION

The rarity of pancreatic injury has been attributed to its retroperitoneal position in the abdomen. Although it is housed in the retroperitoneum, it is often compressed against the rigid spinal column or by discrete intrusion forces.

Young children with flatter diaphragms, thinner abdominal walls and higher costal margins are more susceptible to such injuries. Bicycle bar injuries are the most common mode of injury. The mode of injury described in this case report is strange as the victim was a 3-year-old lying on the floor.

The time lag in reaching the correct diagnosis underlines the fact that pancreatic injury is frequently underestimated or missed initially. This fact has been highlighted by the previous investigators.[1-3] This case report also highlights the well-known fact that injuries to multiple organs complicate the management of these injuries. The various permutations and combinations seen in these presentations warrant a tailored approach towards management.

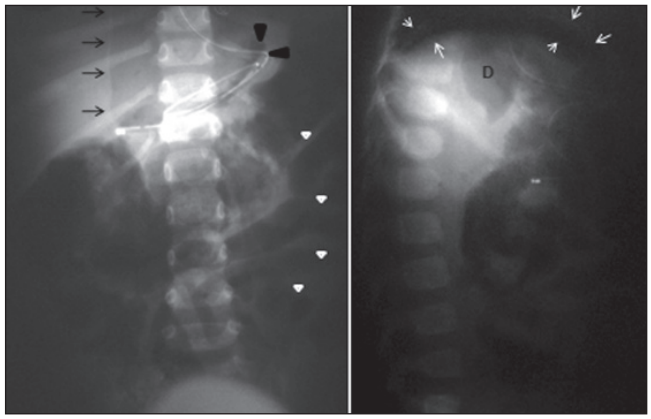


Figure 2: Radiographs depicting falciform sign (thin black arrows), Rigler's sign (solid white arrows), air in lesser sac (solid black arrows), sub-diaphragmatic air (thin white arrows) and 'Doges cap' sign, i.e., gas in Morrison's pouch (D)

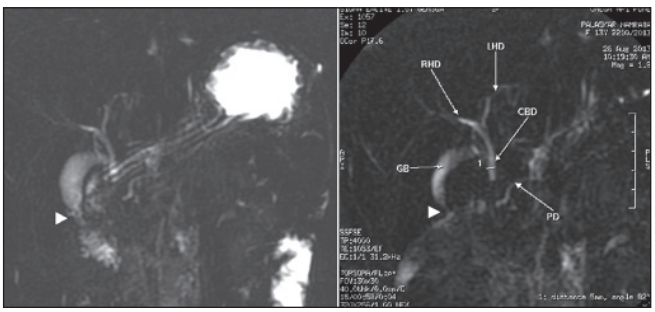


Figure 4: Magnetic resonance cholangio-pancreatography images showing patent cholecystojejunal anastomosis (solid white arrow), prominent pancreatic duct and common bile duct with abrupt cut-off (due to surgical ligation)

The present debate revolves round the efficacy of a conservative approach versus an operative approach. A recent retrospective review infers that primary non-operative management of high-grade paediatric pancreatic injuries is associated with a significant increase in complications and total parenteral nutrition dependency.[4] Nevertheless, no management plan seems to be wrong if it fits the nature and severity of trauma, patient profile, surgeon's expertise and above all the resources available at surgeon's disposal. The time honoured dictum, "When in dilemma, explore" should be the guiding principle in a resource limited setting which poses peculiar diagnostic and therapeutic challenges.

In the above case, pancreaticoduodenectomy might be regarded as a massive procedure for the child but it needs to be noted that damage control surgery followed by conservative management would have been equally difficult. Parenteral nutrition is an essential bridge between damage control and definitive surgeries. Non-availability of adequate and protracted parenteral nutrition is a serious reason behind this decision.

On exploration of the abdomen, the injury was so severe that haemostasis was the only significant role to be played on part of the surgeon; rest of the organs being avulsed. It was thus a proof for Walt's observation: "Finally, to Whipple or not to Whipple, that is the question. In the massively destructive lesions involving the pancreas, duodenum and common bile duct, the decision to do a pancreaticoduodenectomy is unavoidable; and in fact, much of the dissection may have been done by the wounding force."[5]

Cholecystojejunostomy was favoured over choledochojejunostomy since it was technically difficult to anastomose non-dilated bile duct to jejunum. Further, the danger of subsequent development of stricture at the anastomotic site held us back from going ahead with that procedure. Non-feasibility of endoscopic stenting (due to the age of the child) in wake of such a stricture justified our decision.

This child has been doing well for last 9 years with no symptoms like cholangitis or jaundice. This underlines that pancreaticoduodenectomy can be a feasible option even for paediatric patients with the caveat that it should be tailored to the prevailing circumstances. Minor modifications in the procedure are warranted to give good long-term results.

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