

## Case Series : Operative vs Non-Operative Management in Grade III Pancreatic Injury

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### Abstract

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**Introduction:** Pancreatic injury is a rare case, caused by blunt or sharp trauma. Difficulty in making diagnose on pancreatic trauma cases are associated with high mortality, and the treatment can be either operative or conservatively. However, It is still unclear which treatment is more favorable.

**Case:** We present 2 cases of Grade III pancreatic injury with stable hemodynamic who suffered bicycle accident. First case, 12-year-old boy complaining severe pain on the upper left abdomen (VAS 9-10) and get worsening by time, with vomiting. The patient underwent distal Pancreatectomy-Splenectomy. Second case, 8-year-old boy complaining of pain on the upper left abdomen (VAS 6-7) without extension on whole abdominal region with vomiting and fever. The patient was treated conservatively. In both cases, patient was discharged with improvement. However, about 3 months later patients who were treated conservatively developed into a pseudocyst.

**Conclusion:** The selection of management in grade III pancreatic injury can be operative or conservative depending on clinical findings such as hemodynamic condition and the quality of abdominal pain. But the occurrence of pseudocysts pancreas is another surgical challenge.

### Introduction

Blunt pancreatic trauma is a rare case and occurs in less than 5% of all cases of blunt abdominal trauma.<sup>1,2,3,4</sup> Blunt pancreatic trauma occurs because of a compression by large external forces that hits the upper abdomen resulting in an emphasis on the pancreas in the retroperitoneal cavity against the lumbar vertebrae.<sup>5</sup> Blunt pancreatic trauma can appear without clinical manifestations at all, accompanied by the results of normal serum amylase, especially in the acute phase.<sup>1</sup> Therefore, many cases of blunt pancreatic trauma are difficult to diagnose and don't get prompt treatment. Therefore, cases of pancreatic trauma are associated with a high mortality rate of between 9% and 34%.<sup>7</sup>

High mortality is associated with complications in cases of pancreatic trauma. Complications that often occur in cases of pancreatic trauma are the formation of a pseudocyst, traumatic pancreatitis, and pancreatic abscess. Other rare complications include peritonitis, gastrointestinal bleeding, and splenic venous thrombosis.<sup>1</sup> Cases of pancreatic trauma must be treated quickly. Modalities of treatment depend on the state of clinical presentation, hemodynamic state, degree of injury, location of pancreatic parenchymal damage, the integrity of the pancreatic duct and damage to surrounding organs. In these two cases of grade III, blunt pancreatic trauma was presented due to a bicycle accident. However, management in both cases is different, namely operatively and non-operatively.

In the case discussion, we will discuss which treatment is more recommended and how to choose the treatment between operatively and non-operatively.

### Case 1

A 12-year-old boy is brought to an emergency department with complaints of unbearable pain in the upper left abdomen because of hitting a bicycle handle, accompanied by vomiting from one day before admitted to the hospital. The patient had gone to the nearest clinic and was given pain killer medication but there was no improvement. The patient does not complain of fever. Vomiting has more than 5 times a day. The pain was getting worse and he was taken to the emergency room on the second day. With a VAS score of 9-10. On physical examination, he was alert and conscious (compos mentis), blood pressure 120/80 mmHg, pulse 120 x / min, breath rate 30x / minute, temperature 37.0 °C. The abdominal examination found redness of 2 x 2 cm with left hypochondriac tenderness with defans muscular. Laboratory tests found white blood cells 15.16 10<sup>3</sup> / ul; amylase 617 U / L; lipase 671 U / L. Contrast abdominal CT Scan was performed with lacerations with a hematoma in the pancreatic tail region, with the free fluids on peri-pancreatic, peri-splenica, left side abdomen and periphery with other intra-abdominal organs within normal limits.

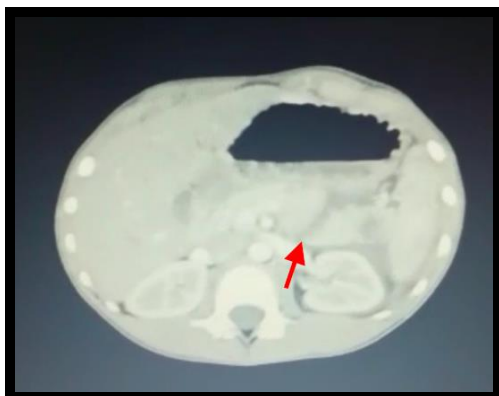


Fig 1. Contrast of Abdomen CT Scan; laceration with hematoma in the tail region of the pancreas, with free fluid in peripancreatic, perisplenica, left side abdomen and perivesika.

Patients undergo laparotomy exploration in general anesthesia. Pancreatic identification showed a partial laceration of about 50% in the pancreatic tail, no pancreatic ducts were seen, saponification was limited to around the lesion. Performed distal pancreatectomy with splenectomy.

Postoperatively, patients were admitted to the ICU for 2 days and have extubation after 24 hours postoperatively. Patients were given antibiotics Ceftriaxone 3x1gr IV and Metronidazole 1x1gr IV. The patient was discharged in good condition after 7 days post-operative. Patient has a good condition after 3 months of control.

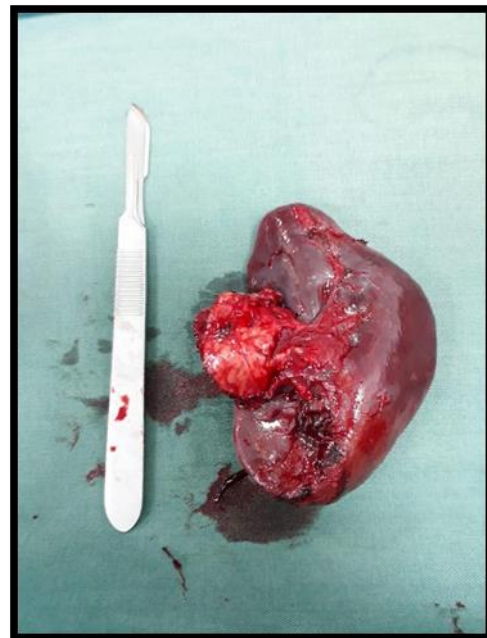


Fig 2. Parts of the distal / tail of the pancreas and spleen.

### Case 2

8 years old boy, comes to the emergency department due to a bicycle accident with complaints of pain in the entire abdomen accompanied by vomiting more than 10 times a day since 1 day before admitted to the hospital. Complaints of abdominal pain start from the upper left side of the abdomen and dispersed to the entire field of the stomach. The patient complained of fever and had taken anti-pyretic and pain killer but there was no improvement. With the VAS score 6-7.

On physical examination he was alert and conscious, blood pressure 110/70, pulse 110x / minute, breathing rate 24x / minute, temperature 36.9 °C. On abdominal examination, redness is found in the left hypochondriac with defans muscular. Laboratory tests obtained white blood cells 32.00 103 / ul; amylase 1038 U / L; lipase 1178 U / L. Contrast abdominal CT Scan was performed with pancreatic lacerations and hematoma in the suspected pancreatic parenchyma body regarding the ductus pancreaticus with surrounding free fluid and it was found a blurry suspect of laceration line on spleen with free fluid around it. Free fluid in perihepatic, between intraabdominal intestines, perivesica with multiple mesenteric lymphadenopathies in the middle abdomen diameter +/- 0.5-0.68cm.

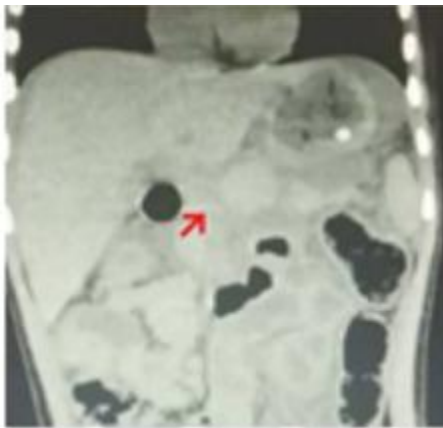


Fig 3. Contrast abdominal CT obtained from pancreatic laceration and hematoma in the suspicious pancreatic parenchyma body regarding the ductus pancreaticus with surrounding free fluid and found to be suspected of a faint laceration line in spleen with free fluid around it.

Early treatment of the patient is strict vital signs control for 24 hours per 30 minutes. Complete peripheral blood test every 6 hours, 12 hours, 24 hours. Given 1000cc Lactate Ringer liquid. A urine catheter and a nasogastric tube are attached with a production of yellowish 50cc. Followed by 500cc / 8h of Ringer Lactate fluid, Ceftriaxone injection of 2 x 1 gr, Ketorolac 3 x 10 mg, Vit K injection of 1 x 10 mg, and transfusion of 250 cc Red Cell Pack. Patients are treated conservatively for 8 days of treatment without an ICU and the patient is discharged with repair conditions. Two months later, the patient came with the results of a pancreatic pseudocyst CT scan measuring 8.84 x 11.75 x 14.6 cm. Patients underwent cystoenterostomy surgery.

## Discussion

Blunt pancreatic trauma is a rare case and occurs in less than 5% of all cases of blunt abdominal trauma.<sup>1,2,3,4</sup> The mechanism of trauma in most pediatric patients with blunt pancreatic trauma is due to motor vehicles accident followed by bicycle accidents due to hitting tip of the handlebar.<sup>5</sup> Diagnosis and initial management reduce the mortality rate of patients.<sup>13</sup>



Fig 4. CT abdominal scan 2 months when the control patient described a pancreatic pseudocyst measuring 8.84 x 11.75 x 14.6 cm.

Make a diagnosis of pancreatic trauma is not easy because it often appears without specific clinical manifestations, accompanied by normal serum amylase results especially in the acute phase.<sup>1</sup> In both cases, the above patients experienced misdiagnosis in the first twenty-four hours. The patient had been treated at the clinic but there was no improvement. Twenty-four hours later the symptoms of abdominal pain worsen with nausea and vomiting, the physical examination found defans of muscular with increased amylase results. Many cases of pancreatic trauma are not immediately identified/misdiagnosed and do not get immediate treatment. Therefore cases of pancreatic trauma have a high mortality rate of between 9% and 34%.<sup>7</sup> Delay in diagnosis for 6-12 hours increases mortality and morbidity.<sup>8,9</sup>

Diagnosis of pancreatic trauma cannot only be from clinical findings, but must include laboratory results, ultrasound imaging, and contrast abdominal CT scan.<sup>1,14,15</sup> Takishima et al and Mayer et al stated that there was a significant relationship between serum amylase with pancreatic trauma.<sup>10,11</sup> Simon et al and Holmes et al specifically found the relationship in the study, 90% of serum amylase and 95% of serum lipase are increased in patients with pancreatic trauma.<sup>12</sup>

Contrast CT scans are the gold standard for diagnosing but their sensitivity and specificity change depending on the onset of trauma. In the first twelve until twenty-four hours after trauma, pancreatic laceration cannot be seen on contrast abdominal CT Scan. Therefore, it is highly recommended to repeat the CT scan after the next 24 hours in the cases with high suspicion of pancreatic trauma but initial CT scan result was negative.<sup>1,14-17, 19,20</sup>

Pancreatic trauma is grading by its severity (I-V). Each treatment selection must be reviewed based on the grading of the trauma. The grading of pancreatic trauma has been determined by the American Association for Surgery in Trauma.<sup>1</sup>

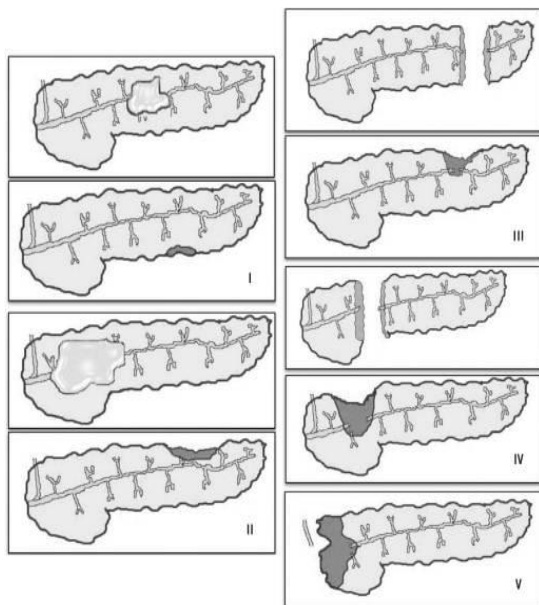


Fig 5. <sup>1</sup> Classification of the severity of pancreatic trauma. Grade I - mild contusion or laceration without accompanying ductal trauma, degree II - severe contusion or laceration without accompanied ductal trauma, grade III - severe transection or laceration with ductal distal pancreatic disorders, grade IV Transection of the proximal part of the pancreas or severe laceration with participation trauma to the ampulla, degree V - Very severe disturbance of the head of the pancreas.

Base on the grading, conservative management have been approved as the main choice in management of grade I and II. In grade III-V , main choice of management becomes less clear and causes controversy. In our both cases are third-grade blunt pancreatic trauma, which according to several literature studies requires distal pancreatectomy and drainage splenectomy. But also many literature start to studied on conservative treatment on patient with third and fourth grade pancreatic trauma.

Ravinder Pal Singh et al stated in their study that pancreatic trauma with third-degree had a good prognosis if immediate operative action was taken.<sup>25</sup> Some cases support conservative treatment on third and fourth degree pancreatic trauma, but with some agreement such as patients with stable hemodynamics, without other organ injuries, and have experts with facilities for endoscopic action (sphincterotomy, stenting, necrosectomy and internal drainage of pseudocysts and percutaneous image-guided drainage.<sup>6,18-24</sup> In addition, adequate nutrient intake, intravenous fluids, and appropriate analgesia are essential at conservative treatment in patients with third and fourth grade pancreatic trauma. Giving octreotide 50 mcg TID in patients with pancreatic duct disorders can be given especially in post resection of the pancreas for 1 week.<sup>20</sup> Amirata et al reported octreotide acetate can reduce the risk of morbidity associated with pancreatic resection by reducing the output of pancreatic fluid.<sup>26</sup> Due to limited facilities and medicines, octreotide is not used in our cases above.

Patients with progressive, hemodynamic, unstable abdominal pain, abdominal distension with an inability to tolerate enteral intake, need for blood transfusions, persistent leukocytosis (>11), sepsis or organ failure are considered to fail in conservative or non-operative treatment. Organ failure that responds to initial resuscitation is not included in the failure of conservative treatment. Endoscopic or radiological intervention externally for fluid drainage, necrosis or abscess is not considered as failure in conservative treatment. Suman BK et al stated of ten patients have success on conservative management.

Six patients with third-grade, five patients underwent cystoenterostomy endoscopy, one patient underwent an interventional radiology procedure in the form of

installing an external drainage pigtail for twenty-eight days without any sequelae. The other four patients with IV degree pancreatic trauma were treated without abdominal exploration, two patients underwent cystogastrostomy endoscopy, the other two underwent endoscopic drainage for pancreatic necrosis and cystoenterostomy.<sup>20</sup>

Based on the point of view in histopathology, pancreatic pseudocysts can be defined as a fluid-filled cavities originating from the pancreas and enveloped by fibrous walls or inflammatory tissues. Cysts can contain pancreatic juice containing of enzymes amylase, lipase, and zymogens, or can also contain serous fluid free of the protease enzyme if it is not associated with the pancreatic duct.<sup>27</sup> There is an Atlanta classification, made based on the pathogenesis of pseudocyst formation. Aim to guide inappropriate management for cases of pancreatic pseudocysts.

The Atlanta classification system is divided into four parts, namely;<sup>27</sup>

a) Collection of acute fluid, occurs at the beginning of the course of acute pancreatitis and does not have granulomatous tissue walls or connective tissue; b) Acute pseudocyst, a consequence of acute pancreatitis or trauma, a cavity surrounded by connective or granulomatous tissue; c) Chronic pseudocysts, arising in chronic pancreatitis and without previous episodes of acute pancreatitis; d) Pancreatic abscess, a collection of intra-abdominal pus near the pancreas with little or no necrosis due to acute or chronic pancreatitis or trauma.

The surgical approach in pseudocyst patient can be indicated with: a) complicated pseudocysts, namely infected and necrotic pseudocysts; b) pseudocysts associated with narrowing of the pancreatic duct and dilated pancreatic ducts; c) cystic neoplasia suspected; d) bile duct stenosis; and e) complications such as abdominal or duodenal compression, perforation and bleeding due to arterial erosion or pseudoaneurysms.<sup>27</sup>

The pseudocyst is a complication of conservative treatment, similar to the case in the second patient who formed a pseudocyst when it came to outpatient treatment after 3 months. In majority, the formed pseudocyst will shrink itself and the use of embolization can reduce the need for sudden surgery and percutaneous drainage can help reduce initial symptoms. Subsequent formation of the pseudocyst can be treated endoscopically or operatively. So in our case, the patient failed conservative treatment because of an exploratory laparotomy, cystoenterostomy for the pseudocyst.

## Conclusion

The selection of treatment in cases of third-degree pancreatic trauma is still pros and cons. But with hemodynamics that is stable, the management selection can be through operative or conservative. However, conservative management should have experts and endoscopic/radiological facilities interventions to deal with complications.

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