**ORIGINAL ARTICLE**
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# Missed pancreatic injury in patients undergoing conservative management of blunt abdominal trauma: Causes, sequelae and management

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## ABSTRACT

**Objective:** Pancreas is a less commonly injured organ in blunt abdominal trauma. This study aimed to analyze the management and outcomes of patients in whom the pancreatic injury was missed during the initial evaluation of blunt abdominal trauma.

**Material and Methods:** We retrospectively (2009-2019) analyzed the details and outcome of patients who underwent conservative management of blunt abdominal trauma, where the diagnosis of pancreatic injury was missed for at least 72 hours following trauma.

**Results:** A total of 31 patients with missed pancreatic injury were identified. All patients were hemodynamically stable following trauma and most (21) were initially assessed only by an ultrasound. A delayed diagnosis of pancreatic injury was made at a mean of 28 (4 to 60) days after trauma when patients developed abdominal pain (31), distension (18), fever (10) or vomiting (8). On repeat imaging, 18 (58.1%) patients had high grade pancreatic injuries including complete transection or pancreatic duct injury. Seven (22.5%) patients were managed conservatively, seventeen (54.8%) underwent percutaneous drainage of intra-abdominal collections, seven (22.5%) underwent endoscopic or surgical drainage procedure for symptomatic pseudocyst. Eleven (35.4%) patients needed readmissions to manage recurrent pancreatitis, intra-abdominal abscess and pancreatic fistula. Three patients required pancreatic duct stenting for pancreatic fistula. There was no mortality.

**Conclusion:** Pancreatic injury may be missed in patients who remain hemodynamically stable with minimal clinical symptoms after abdominal trauma, especially if screened only by an ultrasound. In our series, there was significant morbidity of missed pancreatic injury.

**Keywords:** Pancreatic injury, missed injury, blunt trauma abdomen, ultrasound abdomen

## INTRODUCTION

Pancreas is a less commonly injured organ in blunt abdominal trauma. The incidence of pancreatic injury in blunt abdominal trauma is estimated to be 2 to 5% (1,2). The most common mechanisms of injury include motor vehicle accidents in adults and bicycle handle bar injuries in children (3). Solitary pancreatic injury is uncommon and 80 to 90% patients of pancreatic trauma have at least one other associated abdominal organ injury (4). During initial evaluation of abdominal injury, attention is generally absorbed on the more immediate and catastrophic injuries like the liver and spleen injuries leading to hemorrhagic shock or intestinal perforation leading to septic shock or peritonitis. Pancreatic injury by virtue of its location in retro-peritoneal space can remain asymptomatic initially or present with non-specific signs and symptoms. A number of patients who remain hemodynamically stable after trauma with minimal abdominal signs may initially be evaluated using an ultrasound, especially in rural areas or small clinics where computed tomography (CT) scan is not available. Focused assessment with sonography for trauma, while being excellent for detecting liver or splenic injuries and fluid in abdomen, has a limited role in the diagnosis of pancreatic injury (5,6). Computed tomography (CT) scan is used as the imaging modality of choice for the assessment of pancreatic and associated organ injuries and their complications (7). In as many as 20 to 40 % of the patients with pancreatic injury, the initial computed tomography (CT) scan on admission may fail to show any gross abnormality (7,8). The evolving nature of pancreatic injury often leads to delayed changes which can only be detected in sequential imaging done after a gap of 24 to 48 hours (9). Serum amylase can be

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normal in one third of patients with pancreatic injury (2). Other modalities of imaging like magnetic resonance cholangiopancreatography (MRCP) or endoscopic retrograde cholangiopancreatography (ERCP), which are used to image pancreatic duct and its disruption, have a limited role in an acute trauma setting. Hence, with subtle clinical and radiological findings, a number of pancreatic injuries may be initially missed in blunt abdominal trauma. The aim of this study was to analyze the management and outcomes of patients in whom pancreatic injury was missed during the initial evaluation of blunt abdominal trauma.

## MATERIAL and METHODS

### Study Design

This was a retrospective analysis of prospectively maintained database of patients admitted to a major tertiary care center and university hospital in northern India, from January 2009 to January 2019.

### Inclusion Criteria

This study included all patients who had a delayed diagnosis of pancreatic injury, made more than 72 hours after an initial conservative management of blunt abdominal trauma.

### Exclusion Criteria

1) Patients with documented pancreatic injury during initial evaluation (within 72 hours) of blunt abdominal trauma were excluded from the study.

2) Patients who underwent any surgical intervention for abdominal injuries in the first 72 hours following trauma were excluded from the study.

### Data Collection

Variables recorded in the database included demography, time of presentation after injury, mechanism of injury, associated injuries, symptoms at presentation, serum amylase and lipase levels, grade of pancreatic injury, management, duration of hospital stay, complications and outcome.

### Assessment and Management of Pancreatic Injury

Patients were resuscitated with IV fluids and treated with antibiotics and hyperalimentation as and when required. Multi detector computed tomography (MDCT) of the abdomen was used to confirm and grade the pancreatic injury in all cases. American Association of the Surgery of Trauma classification of pancreatic Trauma-Organ Injury Scale (AAST-OIS) (10) was used for the grading of pancreatic injury on the basis of contrast enhanced computed tomography (CECT) abdomen findings (Table 1). MRCP was performed selectively to evaluate patients with suspected pancreatic ductal injury and ERCP was reserved for pancreatic duct stenting. Depending on the clinical scenario patients were managed either conservatively or with percutaneous drainage (PCD) or surgery.

### Ethics

This was an observational study, and no experimental interventions were carried out. The patients were treated according to the ethical guidelines of the "World Medical Association Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects" adopted by the 18$^{th}$ World Medical Association (WMA) General Assembly, Helsinki, Finland, June 1964, as revised in Tokyo 2004.

### Statistics

Descriptive statistics were mainly used. Quantitative variables were expressed as mean +/- standard deviation and qualitative variables were expressed as percentage. Chi-square and t test were used if applicable on IBM Statistical Package for the Social Sciences (SPSS) Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.

## RESULTS

A total of 31 patients met the inclusion criteria of the study. As expected, most of the patients were young (mean age 20.6 years) males (90.3%). Road traffic accident was the most common mode of injury (77.4%), followed by assault and fall. Demographic details are shown in Table 2. All patients were initially managed conservatively for blunt trauma. Most patients (n= 27) sustained injury in small villages or rural areas. Seven patients considered the injury to be trivial and did not seek medical attention immediately after trauma. Others were managed in primary (4) or mid-level health centers (3) or private clinics (17) and were discharged after a mean of 4 days (1 day to 12 days) of admission. An ultrasound report

**Table 1.** American Association for the Surgery of Trauma classification of pancreatic trauma-Organ Injury Scale (AAST-OIS)

| Grade | Injury | Description |
|---|---|---|
| I | Hematoma<br>Laceration | Minor contusion without ductal injury<br>Superficial laceration without ductal injury |
| II | Hematoma<br>Laceration | Major contusion without ductal injury or tissue loss<br>Major laceration without ductal injury or tissue loss |
| III | Laceration | Distal transection or pancreatic parenchymal injury with ductal injury |
| IV | Laceration | Proximal transection or pancreatic parenchymal injury involving the ampulla |
| V | Laceration | Massive disruption of the pancreatic head |

**Table 2.** Population characteristics of 31 patients with delayed diagnosis of pancreatic injury after initial conservative treatment in blunt trauma abdomen

| Characteristic | Result |
|---|---|
| Age in years (range) | 20.6 (7-38) |
| Sex | |
| Male | 28 (90.3%) |
| Female | 3 (9.6%) |
| Location of accident | |
| Rural | 27 (87.1%) |
| Urban | 4 (12.9%) |
| Mechanism of injury | |
| Road traffic accident | 24 (77.4%) |
| Assault | 5 (16.1%) |
| Fall | 2 (6.4%) |
| Associated injuries | |
| Total | 16 (51.6%) |
| Liver | 7 (22.5%) |
| Spleen | 4 (12.9%) |
| Non-abdominal injuries | 5 (16.1%) |
| Time from Injury to diagnosis of pancreatic injury (days) | 28 (4-60) |
| Symptoms at diagnosis of pancreatic injury | |
| Pain in abdomen | 31 (100%) |
| Distension of abdomen | 18 (58.1%) |
| Fever | 10 (32.2%) |
| Vomiting | 8 (25.8%) |
| Vitals at diagnosis of pancreatic injury (mean) | |
| Pulse | 88/min |
| BP | 108/74mm hg |
| Labs at diagnosis of pancreatic injury (mean / range) | |
| Hb | 10.86 gm/dl (8-13) |
| TLC | 12.3 x 109/L (6900-25200) |
| Platelet count | 127 x 109/L (87-224) |
| Bilirubin | 1.4 mg/dl (0.9-2.4) |
| Serum creatinine | 1.35mg/dl (0.8-2.1) |
| Serum amylase | 742.5 U/L (196-1940) |

Hb: Haemoglobin, BP: Blood pressure, TLC: Total leucocyte counts.

was available in 21 patients, none of which showed any evidence of pancreatic injury.

Three patients had a computed tomography (CT) scan performed at the time of initial evaluation, none of which showed any evidence of pancreatic injury. Only one patient had a repeat computed tomography (CT) scan performed 12 days after the injury due to abdominal distension which showed peri-pancreatic collection, and the patient was referred to us. Eleven patients (35.4%) had associated liver or splenic injuries which were also managed conservatively as per our study criteria. On average, a delayed diagnosis of pancreatic injury was made at 28 (4 to 60) days after trauma when patients developed clinical manifestations of pancreatic injury. Abdominal pain was present in all patients, followed by abdominal distension (58.1%), fever (32.2%) and vomiting (25.8%). All patients were resuscitated if needed, and imaging in the form of contrast enhanced computed tomography (CECT) was obtained in all patients. 41.9% of the patients had low grade (Grade I/II) injuries and 58.1% had high grade injuries (Grade III/IV). Further details and management based on grade of injury are shown in Table 3.

**Table 3.** Grading of pancreatic injury and management of 31 patients with delayed diagnosis of pancreatic injury after initial conservative treatment in blunt trauma abdomen

| Grade | No of patients | Conservative | Percutaneous drainage | Surgery | Complications |
|---|---|---|---|---|---|
| I | 4 (12.9%) | 4 | 0 | 0 | None |
| II | 9 (29%) | 3 | 6 | 0 | None |
| III | 14 (45.1%) | 0 | 9 | 5 | Pancreatic fistula (n= 3)<br>Pancreatic abscess (n= 2)<br>Pancreatitis (n= 4) |
| IV | 4 (12.9%) | 0 | 2 | | Pancreatic abscess (n= 2) |

### Serum Amylase

Initial reports of serum amylase following trauma were not available. We measured serum amylase when patients presented to us with complications. Mean serum amylase levels were 742.5 U/L (normal range, 40 to 140 U/L). Mean serum amylase levels in Grade 1 and 2 injuries was 376.5 + 102.9 U/L and that in Grade 3 and 4 injuries was 1040.8 + 386.8 U/L. This difference was statistically significant in unpaired t test with $p< 0.0001$.

### Management

### Conservative

Seven out of 31 (22.5%) patients were managed conservatively. All had Grade I or II injuries.

### Percutaneous Drain Placement

Overall, 17 out of 31 patients needed PCD by interventional radiology. Six out of 31 (19.3%) patients required a placement of single drain, most common site of collection being lesser sac. Eleven out of 31 (35.4%) patients required multiple PCD placement to drain all intraabdominal collections. Most common sites being lesser sac followed by left paracolic and pelvis. PCD's were removed at a mean of 23.6 days (range 11 to 60 days) days after the placement.

### ERCP With Pancreatic Duct Stenting

Three patients developed high output pancreatic fistula from the percutaneously placed drain (> 500 ml/day) which continued for more than 2 weeks. MRCP was suggestive of ductal injury with communication at region of body in two and body-tail junction in one patient. All of these patients underwent pancreatic duct (PD) stenting by ERCP. In all three patients, drain output reduced subsequently and drain was removed in 38, 46 and 60 days respectively.

### Surgical drainage

Seven out of 31 (22.5%) required surgical drainage for a symptomatic pseudocyst (mean size of 8.4 cm). The procedure was carried out at an average of 98.7 days after the trauma. Endoscopic cystogastrostomy was done in 4 patients, who had a pseudocyst in lesser sac and significant bulge on posterior gastric wall on endoscopy. One patient developed a pseudocyst in lesser sac without a significant gastric bulge and underwent laparoscopic cystogastrostomy. Roux-en-Y cystojejunostomy was done in two patients (one patient had two pseudocysts and same roux limb was used to drain both pseudocysts).

### Hospital Stay

Mean duration of hospital stay was 12.4 days (range, 8 to 20 days).

### Follow Up

In long-term follow-up after discharge (9 months to 10 years), a further morbidity rate of 35.4% (11/31) was seen, leading to readmissions. Pancreatitis developed in 4 patients and all were managed conservatively. Recurrent intraabdominal collections developed in 4 patients and were managed by insertion of percutaneous drainage and antibiotics. Persistent pancreatic fistula in 3 patients was managed by pancreatic duct (PD) stenting. All these complications were seen in patients with grade III or IV injury. No morbidity was observed in patients undergoing pseudocyst drainage. There was no mortality in any group. Also, follow-up imaging revealed smaller (<5 cm) pseudocysts in 6 more patients. These were either asymptomatic or managed conservatively for mild associated pain.

## DISCUSSION

Through this paper, we bring to light a number of cases of pancreatic injury sustained during blunt abdominal trauma which were initially missed and presented later with symptoms after a gap of 4 to 60 (mean 28) days after the injury. There seems to be a number of reasons as to why the pancreatic injury was missed initially.

First, all patients in our group were hemodynamically stable patients, undergoing non-operative treatment. This implies that we have auto selected patients with less severe injuries, which are more likely to be missed. In a study by Leppäniemi AK and Haapiainen RK (11), delayed diagnosis or missed early diagnosis was more likely in patients with isolated pancreatic injuries, absent or minimal other associated abdominal injuries or in those undergoing non-operative management without any follow-up imaging. Miller et al. have studied 338 patients with liver trauma out of which 89% patients underwent non-operative management. In the non-operative group, missed injury

occurred in seven (2.3%), while there was no missed injury in operative group (12). Our series also included a significant number of grade III and IV injuries. This suggests that even higher grade pancreatic injuries may be clinically silent (pancreatic lucid interval) in the initial few days after trauma and present themselves later with growing pseudocysts or peripancreatic collections.

Second, all of our patients belonged to smaller towns and rural areas of the state. All but three patients underwent initial management of abdominal trauma at primary health centers or small private clinics where CT scan was not available. Also, since patients remained clinically and hemodynamically stable, ultrasound abdomen might have been thought to be sufficient by the treating physician. Pancreatic injuries are very likely to be missed on an ultrasound. Jeffrey et al. (5) have reviewed ultrasound findings in 4 patients with surgically proven acute pancreatic trauma. Despite technically sound sonograms, pancreatic injuries could not be detected before surgery in any of the patients.

A CT performed shortly after ultrasound was able to demonstrate changes of pancreatic trauma in each case. Ultrasound findings suggestive of pancreatic injury can be simply enlargement of the pancreas or diffuse edema simulating pancreatitis. Peripancreatic fluids may be a sign of pancreatic contusion (13). Real-time contrast-enhanced US can give additional information, but its role should not be considered as a replacement for CT (14). In spite of these shortcomings, ultrasound does have a definite role in the follow-up of complications such as pseudocysts and fluid collections.

Third, even a CT scan can miss pancreatic injury in the initial part of investigation. CT is the most commonly used diagnostic modality for suspected pancreatic trauma and its complications. CT has a reportedly variable sensitivity (65%-80%) and specificity for detecting pancreatic trauma (4,15,16). CT is not a very sensitive test for pancreatic ductal injury (17). Specific signs of pancreatic injury include laceration, transection, focal pancreatic enlargement and inhomogeneous enhancement. Fluid collections like hematoma and pseudocyst can be seen communicating with the pancreas at the site of laceration or transection. Nonspecific signs include peripancreatic fat stranding, peripancreatic fluid collections, fluid between the pancreas and splenic vein, hemorrhage, thickened left anterior pararenal fascia and associated injuries to adjacent structures (15). The pancreas may appear normal in 20% to 40% of the patients when CT is performed within 12 hours after trauma because pancreatic injuries may produce little change in the density, which may not be detectable (4,18). This is likely due to obscuration of the laceration plane, hemorrhage, and close apposition of the pancreatic fragments. On repeat scanning at 12 to 24 h, an abnormality which was initially ambiguous or subtle becomes more evident. Findings become more radiologically apparent over time with the development of post-traumatic pancreatitis, edema, leakage of pancreatic enzymes, and subsequent auto-digestion of the surrounding parenchyma (4,19). Inability to detect early pancreatic trauma with CT may not be a limitation of CT technology but reflects the evolving nature of pancreatic trauma. An initial pancreatic contusion can progress to subsequent pancreatic transection with progressive autodigestion of the pancreatic gland.

**Serum Amylase**

Raised serum amylase can be useful in diagnosis, but there is poor correlation between raised amylase and pancreatic trauma because amylase may be elevated in injuries of the salivary gland, in duodenal trauma, hepatic trauma, and injuries to the head and face, and in an intoxicated patient (20,21). Almost one third of patients may have a normal serum amylase at initial presentation in spite of pancreatic transection. A raised amylase level after blunt pancreatic trauma is time dependent, and a persistently elevated or a rising amylase level is a more reliable indicator of pancreatic trauma, but it does not indicate the severity of the injury (22). All our patients had elevated amylase levels, which is probably a reflection of late presentation and evolved pancreatic injury.

**Management and Outcome of Missed Pancreatic Injury**

Patients presented to us at an average of 4 weeks after blunt trauma. Patients were initially managed with fluid resuscitation, antibiotics and hyperalimentation as and when required. None of the patients were hemodynamically critical at presentation to us. Patients complained of abdominal pain, vomiting and fever which was attributable to either fluid collections (sterile/infected) or localized symptomatic pseudocysts. Our results indicate that most patients could be managed non-surgically by drain placement into the fluid collections. Those who presented with well-formed symptomatic pseudocysts could be managed by an endoscopic or surgical drainage procedure. Morbidity rate was 35.4 % in the non-operative group and included pancreatitis, pancreatic abscess and recurrent pancreatic fistula.

ERCP with PD stenting was needed in three patients who had persistent/recurrent pancreatic fistula non-respondent to conservative measures. A transpapillary stent can reduce the leaking of pancreatic juice by bridging the disruption, or it can reduce the pressure of the pancreatic duct by allowing preferential flow through the stent into the pancreatic sphincter. We generally give a trial of Octreotide to control a high output (> 500 ml/day) pancreatic fistula. There was no morbidity in the surgically managed patients. There was no mortality in either of the groups in this series.

### Operative vs Non-Operative Management of Pancreatic Injury in Blunt Trauma Abdomen

There is a general consensus that stable patients with low grade pancreatic injuries without pancreatic ductal injury (grade I and II) can be successfully managed conservatively with low morbidity (<20%) and mortality (9, 23). Surgical treatment is mostly recommended for high grade injury with main pancreatic duct disruption (grades III, IV, V). For grade III injuries, distal pancreatectomy + splenectomy is the standard surgery of choice (8,24). If the injury occurs at the neck, then pancreaticojejunostomy may be done as an alternative. For grade IV injuries, pancreatic drainage is recommended as part of damage control surgery (23, 25). For pancreatic injury grade V, treatment options vary from drainage to single or two stage pancreaticoduodenectomy (23). Diagnostic delays and main pancreatic duct leaks are associated with increased morbidity and mortality (26-28). Early surgical management is associated with decreased morbidity and length of hospital stay particularly for injuries to body and tail of pancreas (27,28). In a study of 39 high-grade pancreatic injuries (grades III and IV), patients who received conservative treatment were observed to required longer hospitalizations, more days of total parenteral nutrition and a greater incidence of complications (29). Conservative management of high grade injuries is a topic of controversy. In recent years there have been increasing numbers of publications describing conservative management of high grade pancreatic injury with successful outcomes (30-33).

Hamidian et al. (30) have compared 39 patients with major ductal injury undergoing surgical management with 12 patients undergoing conservative management. They have concluded that both operative and non-operative management of major grade blunt pancreatic injuries are acceptable, depending on the clinical condition, with similar complication rates.

Morbidity remains high with non-operative management; however, majority of the complications can be managed non-operatively. In hemodynamically stable patients, a controlled leak walled off as a pseudocyst, absent associated organ injuries and absent pancreatic necrosis predict a higher success rate for non-operative strategy of high grade pancreatic injuries. Koganti et al. (33) have studied 34 patients with grade III/IV trauma out of which 26 were initially under a conservative management. 10 of them could be successfully managed without any operation. On multivariate logistic regression, presence of necrosis and associated organ injury predicted failure of conservative management. Development of a pseudocyst was associated with a success of non-operative treatment. They concluded that non-operative measures should be attempted in a select group of grade III and IV blunt pancreatic trauma who are hemodynamically stable with a controlled leak walled off as a pseudocyst without associated organ injuries and pancreatic necrosis.

Our study also supports the feasibility of conservative management in patients with high grade (III and IV) pancreatic injuries, who remain hemodynamically stable. In our group of auto triaged patients, late complications were managed either with radiological drainage or a surgical drainage procedure. There was significant morbidity (35.4%), but no mortality. Morbidity was significantly less in patients who developed a pseudocyst.

The interpretation of this study is limited due to its retrospective nature and the limited sample size. Our series of patients do not represent the complete spectrum of pancreatic injuries, especially more severe injuries involving hemodynamically unstable patients. Also, most of our patients were initially evaluated only by an abdominal ultrasound.

## CONCLUSION

Pancreatic injury may be missed in patients who remain hemodynamically stable with minimal clinical symptoms after abdominal trauma, especially if screened only by an ultrasound. Follow up imaging by CT can prevent such missed cases. Late complications of missed injury can cause significant morbidity; however, these can be usually managed by percutaneous drain placements or pseudocyst drainage. An endoscopic transpapillary stent can be useful option for pancreatic fistula.

**Ethics Committee Approval:** The study was obtained from King George's Medical University Instutional Ethics Committee (Date: 05.01.2021, Number: 20).

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept –V.G., A.C.; Design – V.G., A.C.; Supervision –V.G., A.C.; Materials - All of authors; Data Collection and/or Processing - V.G., A.C., V.S.S., N.K.; Analysis and/or Interpretation – V.G., A.C., V.S.S., N.K.; Literature Search- All of authors; Writing Manuscript – V.G., A.C.; Critical Reviews – All of authors.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

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**ORİJİNAL ÇALIŞMA-ÖZET**
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# Künt karın travmasının konservatif tedavisi uygulanan hastalarda gözden kaçan pankreas yaralanması: Nedenleri, sekelleri ve tedavisi

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## ÖZET

**Giriş ve Amaç:** Künt batın travmalarında pankreas en az hasar alan organdır. Bu çalışmanın amacı, künt batın travması sonrası yapılan ilk değerlendirmede pankreas yaralanması atlanan hastaların tedavilerini ve sonuçlarını analiz etmekti.

**Gereç ve Yöntem:** Travma sonrası pankreas yaralanması tanısının en az 72 saat süresince atlanmış olduğu künt batın travmalı hastaların konservatif tedavilerinin sonuçlarını ve detaylı bilgilerini retrospektif olarak (2009-2019) değerlendirdik.

**Bulgular:** Pankreas yaralanması atlanan 31 hasta saptandı. Travma sonrası tüm hastalar hemodinamik olarak stabildi ve çoğunluğu (21) sadece ultrason ile değerlendirilmişti. Hastalarda karın ağrısı (31), distansiyon (18), ateş (10) veya kusma (8) gelişince travma sonrası pankreas hasarının gecikmiş tanısı ortalama 28 günde (4-60 gün) konulmuştu. Tekrarlanan görüntülemede tam pankreas transeksiyonu ve pankreas yolu yaralanması dâhil yüksek dereceli pankreas hasarı 18 (%58,1) hastada görüldü. Yedi hasta (%22,5) konservatif olarak tedavi edilirken on yedi hastada (%54,8) intraabdominal birikimler perkutan drenaj ile tedavi edildi ve yedi hasta (%22,5) semptomatik psödokist için endoskopik ya da cerrahi drenaj işlemlerine tabi oldu. Tekrarlayan pankreatit, intraabdominal apse ve pankreas fistülü sebebiyle on bir hasta (%35,4) tekrar hastaneye kaldırıldı. Pankreas fistülü için üç hastada pankreas yolu stentlemesi gerekti. Mortalite olmadı.

**Sonuç:** Özellikle sadece ultrason görüntülemesi yapılan, karın travması sonrası hemodinamik olarak stabil ve minimal klinik belirtiler gösteren hastalarda pankreas yaralanması atlanabilir. Bizim serimizde önemli oranda atlanan pankreas yaralanması morbiditesi mevcuttu.

**Anahtar Kelimeler:** Pankreas yaralanması, gözden kaçan yaralanma, künt travma karın, karın ultrasonu

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