BACKGROUND:
Pseudocyst of the pancreas following trauma is an uncommon abdominal condition. Its diagnosis is infrequently made before surgery because of its varying ways of presentation and masquerading as other cystic abdominal conditions.

AIMS AND OBJECTIVES:
This is to report a case of traumatic pseudocyst of the pancreas in a female patient aged 30 years with the hope of increasing awareness among practicing surgeons.

CASE REPORT:
A 30-year-old female presented with a history of sudden onset of left upper abdominal pain and abdominal swelling of seven years duration following a road traffic accident. She was neither pale nor dehydrated. Her pulse rate was 84 per minute and blood pressure was 110/70 mmHg.

She was resuscitated and had an exploratory laparotomy. The patient was found to have a pseudocyst of the pancreas and a cystogastrostomy was performed. Her postoperative follow-up was satisfactory.

Conclusion: Pseudocyst of the pancreas following trauma is uncommon. Sometimes it may pose a diagnostic challenges. A high index of suspicion, early diagnosis, careful resuscitation and skilful surgical intervention will improve outcome.

KEY WORDS: Trauma, Pseudocyst of pancreas, diagnostic dilemma.

INTRODUCTION
Pancreatic pseudocysts belong to a large and heterogeneous group of cystic pancreatic lesions and represent a complication of acute or chronic pancreatitis. Pseudocysts of the pancreas following trauma are quite rare in our environment. Due to progress in sensitivity and more widespread availability of diagnostic imaging techniques, the incidence of pancreatic pseudocysts seems to be increasing steadily. The development of new interventional options for the diagnosis and treatment of pancreatic pseudocysts allows for different approaches to the disease. Sometimes diagnostic challenges are encountered. Histopathologically, pancreatic pseudocysts can be described as fluid-filled cavities arising from the pancreas and surrounded by a wall of fibrous or inflammatory tissue, but lacking an epithelial cover. The cyst can be filled with pancreatic juice containing amylase, lipase and zymogens especially when there is communication with the duct. On the other hand, if no communication with the pancreatic ducts exists, fluid may be of protease-free serous type.

CASE REPORT.
A 30 year old house wife with tertiary level of
education presented on 4th April, 2011 with recurrent left flank pain of 7 yrs duration. She had an accident 7 years ago. She developed severe abdominal pain a month later, which was sudden in onset and was located at the left hypochondrial region. It was a sharp, intermittent pain worse on lying down and radiated to the left iliac region. At the onset of symptoms, she went to a private hospital in Port Harcourt where an ultrasound scan (USS) done revealed a localized fluid collection and she was treated on an outpatient basis. However, the symptoms recurred so she went for further USS which revealed a poorly delineated tail of pancreas with a cystic mass measuring about 9.80 x 9.21cm in the left hypogastric area, with the mass lying sandwiched between the pancreatic tail, spleen and upper pole of the left kidney. Differential diagnoses of pancreatic pseudocyst, para-renal cyst, and left adrenal cyst were made and an abdominal computerized tomographic (CT) scan was advised. She then presented to the University of Port Harcourt Teaching Hospital (UPTH) for further evaluation and management. She had had appendicectomy.

On examination of the abdomen, there was mild tenderness at the left hypochondrium with a palpable cystic mass that was possibly retroperitoneal. The liver and spleen were not palpable and the kidneys were not ballotable. There were no left supraclavicular fullness (Virchow's nodes) or palpable umbilical nodule (Sister Mary Joseph nodes). Rectal examination findings were unremarkable. Differential diagnoses of Pancreatic pseudocyst and left renal cyst were made.

INVESTIGATIONS AND RESULTS:
Serial repeated Ultrasonography and abdominal CT where done due to the diagnostic dilemma.

Abdominal Ultrasound scan done 18-01-2011 showed “poorly delineated tail of pancreas Cystic mass measuring 9.80 x 9.21cm in the left hypogastric area. Mass lies sandwiched between the pancreatic tail, spleen and upper pole of left kidney. DD: pancreatic pseudocyst, para-renal cyst, left adrenal cyst”. Abdominal CT done on 18-04-2013 revealed “pancreatic tail lies between the mass and the stomach and is displaced anteriorly”. Findings on contiguous axial section showed “a fairly rounded well defined non-enhancing hypodense mass in the left lumbar region, lying between the stomach and the left kidney, displacing the left kidney anteriorily, measuring about 8.8 x 7.7cm with a hue of 16.76 (fluid). Impression was that of suprarenal cystic mass to rule out huge splenic cyst. A repeat Abdominal USS done on 15-03-2013 showed “huge multiloculated cystic mass within the left lumbar region measuring about 9.0 x 15.0cm. Cyst is closely related to the lateral border of the renal capsule and appears not to originate from it. It was suggestive of a left lumbar mass with differential of para-renal cyst”. An Intravenous urography done on 20-05-2013 showed “a low lying right kidney due to suspected congenital cause, displacement due to suprarenal mass”. Repeat Abdominal CT done in UPTH on 05-06-2013 showed “left sided retroperitoneal cystic mass with differential diagnoses of pancreatic pseudocyst, mesenteric cyst, omental cyst”. Repeat Abdominal CT done on 23-08-2013 showed “pseudopancreatic/splenic cyst”, Packed cell volume done on 24-09-2013 was 39%, Serum electrolyte urea and creatine levels were within normal range.

She had an exploratory laparotomy and Cystogastrostomy for pseudocyst of the pancreas was carried out. Findings at laparotomy were: “Cystic mass (About 15cm in diameter) arising from mid-tail region of pancreas Fig 1 & 2, aborting on the left hilum of the kidney and spleen, arising from tail of pancreas, clear fluid up to 1.5L was drained from the cyst”. Figure 3 shows anastomosis of stomach and cyst cavity.

Post-operative condition was satisfactory. She was managed with analgesics, antibiotics and intravenous fluid. The post operative USS revealed normal findings.
Figure 1.

Figure 2.

Figure 3.
Discussion:

Pancreatic pseudocysts are a known complication of acute or chronic pancreatitis, with a higher incidence in the latter, trauma causing pseudocyst of pancreas is not common. Currently several classification systems are in use. These systems of classifications are based on the origin of the pseudocyst, their relation to pancreatic duct anatomy and a possible pseudocyst–duct communication. Diagnosis is accomplished most often by CT scanning, by endoscopic retrograde cholangiopancreatography (ERCP) or by ultrasound, and rapid progress in the improvement of diagnostic tools has enabled detection with high sensitivity and specificity.

Currently, ERCP is not done in our centre. Sometimes interpretation of results may be a challenging factor. There are different therapeutic strategies: endoscopic transpapillary or transmural drainage, percutaneous catheter drainage, or open surgery as in index case. The feasibility of endoscopic drainage is highly dependent on the anatomy and topography of the pseudocyst, but provides high success and low complication rates. Percutaneous drainage is used for infected pseudocysts. However, its usefulness in chronic pancreatitis-associated pseudocysts is questionable. Internal drainage and pseudocyst resection are frequently used as surgical approaches with a good overall outcome, but a somewhat higher morbidity and mortality compared with endoscopic intervention.

Several classification systems of pancreatic pseudocysts have been proposed addressing either the pathogenesis of pseudocyst formation, as in the Atlanta classification, or morphological features such as pancreatic duct anatomy and communication of the pseudocyst with the ducts. The latter are less frequently used. The Atlanta classification system subdivides four entities: a) acute fluid collection, occurring early in the course of acute pancreatitis and lacking a wall of granulomatous or fibrous tissue; b) acute pseudocysts, a cavity surrounded by fibrous or granulomatous tissue that is a consequence of acute pancreatitis or trauma; c) chronic pseudocysts, arising in chronic pancreatitis and without a preceding episode of acute pancreatitis; and d) pancreatic abscess, an intra-abdominal collection of pus in the proximity of the pancreas with little or no necrosis resulting from acute or chronic pancreatitis or trauma. The diagnosis of an acute pseudocyst can be made if an acute fluid collection persists for 4–6 weeks and is enveloped by a distinct wall.

Another classification system offered by D'Egidio and Schein in 1991 is also based on the underlying disease (acute, acute-on-chronic or chronic pancreatitis), but takes the duct anatomy (normal, diseased, strictured) and the pseudocyst–duct communication (rare, sometimes, always) into account. Nealon and Walser classified pancreatic pseudocysts according to the duct anatomy and the presence or absence of communication with the pseudocyst cavity. The aim of this classification system was to propose guidelines for an appropriate treatment of pancreatic pseudocysts.

The incidence of pseudocysts in both acute and chronic pancreatitis has been assessed in large series of clinical studies. The relative proportion of acute and chronic pseudocysts varies between reports and depends on how pancreatic pseudocysts are defined and by what means they are detected. The incidence of pseudocysts ranges from 5% to 16% in acute pancreatitis, whereas in chronic pancreatitis the numbers are higher and incidence rates of 20–40% have been published even in cohorts where advanced imaging techniques were not employed.

The highest incidence of pancreatic pseudocysts can be found in patients with chronic pancreatitis due to alcohol abuse. In a study of 97 patients with pseudocysts, alcohol consumption was found to be the causative factor in 64% of patients with chronic pancreatitis and in 26% of patients with acute pancreatitis. Other studies also revealed alcohol-related pancreatitis preceding pancreatic pseudocysts in about 56–78% of patients. Besides this, as far as aetiology of pancreatitis is concerned 6–36% of pseudocysts arise in gallstone-induced pancreatitis, 3–8% in post-surgical or traumatic pancreatitis, rarely after hyperlipidaemia-induced pancreatitis and in 6–20% no cause is found (idiopathic pancreatitis).

A variety of diagnostic tools including CT scanning, transcutaneous and endoscopic ultrasound, ERCP and cyst aspiration, chemistry and cytology are used for the diagnosis of pancreatic pseudocysts. According to the Atlanta classification a pseudocyst is characterized by presence of a defined wall of fibrous or granulomatous tissue whereas the acute fluid collection lacks that boundary. However, a late pancreatic necrosis may also have a partly organized encapsulated morphology and differentiation becomes more difficult. On CT...
imaging the capsule or wall of a pseudocyst shows evidence of contrast enhancement. A necrosis, particularly an infected one, can be presumed by non-enhancing zones or a heterogeneous pancreas seen on CT. However, the final diagnosis should correlate with the clinical condition of the patient.

In fact, employing imaging techniques, pseudocyst characteristics like size, location, wall thickness and septa can be detected. However, approximately 10% of pancreatic pseudocysts can have ill-defined features that overlap with the characteristics of cystic tumours.

As transabdominal ultrasonography is a very cheap and non-invasive technique it should be performed as a first step in the diagnosis of pancreatic pseudocysts. Taking into account that the gland can only be visualized in 80% of patients and that the technique is highly dependent on the experience of the sonologist, the diagnostic sensitivity of 88–100% and the specificity of 92–98% are still high. However, the negative predictive value (NPV) has been calculated with only 9%, which makes transabdominal ultrasound a poor tool to exclude small pancreatic pseudocysts. If interventional treatment is to be attempted, the use of a colour Doppler ultrasound, visualizing blood vessels, greatly increases the safety of the procedure.

Since pancreatic cystic lesions are pathologically a heterogeneous group, high-resolution Endoscopic US(EUS) imaging is documented in literature to helps to detect the majority of cystic lesions and, for small lesions<2cm.

There is a consensus that CT scanning is mandatory for planning the therapy of a pancreatic pseudocyst and CT imaging yields the highest sensitivity (82–100%) and specificity (98%, NPV: 92–94%) and an overall accuracy of 88–94%.

Pseudocysts mostly appear as round, fluid-filled cavities surrounded by a dense wall. CT scans should also be reviewed for location and thickness of wall, internal architecture of pseudocysts, probable necrotic debris and relation of pseudocysts to arterial vessels, as the proximity to arteries may influence the therapeutic strategy.

Endoscopic retrograde cholangiopancreatography (ERCP) is of major importance regarding the management of pseudocysts not only as a diagnostic tool, but also for endoscopic therapy. Although ERCP provides less information regarding the size and surrounding visceral structures than CT and ultrasound, it provides important information on the anatomy of the pancreatic and biliary ductal system and helps categorize pancreatic pseudocysts according to the classification systems by Nealon and Walser or D'Egidio and Schein.

The sensitivity of magnetic resonance cholangiopancreatography (MRCP) varies between 70% and 92% if ERCP is used as the gold standard. The fact that MRCP has a lower complication rate than ERCP and is less investigator-dependent than ultrasound will lead to its increased use as a diagnostic procedure for chronic pancreatitis in spite of its cost and its inherent lack of therapeutic options. A diagnosis of pseudocyst–pancreatic duct communication is rather difficult, as a communication can only be identified by MRCP if a high intensity fluid tract can be detected between the pseudocyst and the duct. In this respect ERCP was found to be superior to MRCP.

The management of pseudocysts also depends on the aetiology. Cystic pancreatic lesions, arising after an episode of acute pancreatitis, may resolve without treatment over a period of 4–6 weeks, whereas in chronic pancreatitis spontaneous pseudocyst resolution occurs rarely as maturation of the cyst wall is already complete. The probability of spontaneous resolution ranges widely from 8% to 85%, depending on the aetiology, the localization and, predominantly, the size.

According to Warshaw and Rattner, a pseudocyst is unlikely to resolve spontaneously if: a) it persists for more than 6 weeks, b) chronic pancreatitis is evident, c) there is a pancreatic duct anomaly (except for a communication with the pseudocyst) or d) the pseudocyst is surrounded by a thick wall. Studying 92 patients with chronic alcoholic pancreatitis, Gouyon and co-workers reported a spontaneous regression rate of 25.7%. However, pseudocysts >4

The aim of endoscopic treatment is to create a connection between the pseudocyst cavity and the gastrointestinal lumen. There are various methods for carrying out an endoscopic drainage and it can be accomplished by either a transpapillary or a transmural approach; the latter requires access through the stomach (cystogastrostomy) or the duodenum (cystoduodenostomy). Pseudocysts should have a mature capsule (wall thickness >3cm).

If the pseudocyst communicates with the pancreatic duct, transpapillary drainage becomes the therapy of choice. Pancreatic duct sphincterotomy facilitates cannulation. If pseudocysts present with heterogeneous content, either necrotic or filled with debris, or an abscess is suspected, a transpapillary nasocystic catheter
is inserted to allow aspiration of the pseudocysts content and rinsing of the cystic cavity with saline. Broad-spectrum antibiotics will be administered in case of infected pseudocysts. The duration of stenting depends on the time course of pseudocyst regression. The length of therapy varies, with a median of 4.4 months 48. In a study by Catalano et al., stents were routinely exchanged every 6–8 weeks as long as pseudocysts remained unresolved.

When the pseudocyst causes a visible impression of the gastric or duodenal wall, transmural drainage becomes a feasible option. Apposition of the cyst wall towards the stomach or small intestine is ascertained by CT scan or EUS and intraluminal bulging should be obvious on upper endoscopy. Once the bulge is located, its apex can be identified for needle puncture. Following needle puncture of the pseudocyst fluid content can be aspirated (for chemical or cytological analysis) and a guidewire is inserted, along which an incision can be made using either a diathermic coagulation probe or a needle-knife-papillotome. Once access has been achieved, either a balloon or a double-pigtail catheter can be passed into the cyst over the wire. Transmural stents are removed after complete resolution of the pancreatic pseudocyst, which is monitored by CT, or preferably ultrasound, performed at 4-week intervals after the initial endoscopic drainage.

Complications are related either directly to the procedure or can occur in relation to stents and drains. Bleeding is one of the most serious complications in endoscopic drainage, as variceal or arterial bleeding due to penetration of the gastric or duodenal wall can occur, requiring sclerotherapy or emergency surgery. Complications of transpapillary drainage are closely related to those of ERCP and include pancreatitis, risk of bacteraemia or sepsis and abscess formation. Stent-related complications imply dislocation and clogging with subsequent infection. Pigtail stents may be inferior in drainage capacity to straight stents but the risk of migration is lower.

Endoscopic drainage seems to be an effective tool in treating pancreatic pseudocysts, with final success rates of >80%. Recurrence of pseudocysts or complications may require endoscopic re-treatment. In conclusion, if technically feasible, endoscopic drainage should be the method of choice to treat large pancreatic pseudocysts.

Percutaneous drainage involves either simple percutaneous aspiration or percutaneous catheter placement, most commonly performed under CT control, but in some cases under sonographic or fluoroscopic guidance. It is a valuable alternative to operative management, as maturation of the pseudocyst wall does not have to be awaited. Further indications are symptomatic, expanding immature cysts and patients with infected pseudocysts. Drainage can be performed via a 7–12F pigtail catheter that is inserted into the pseudocyst via needle-inserted guidewires or alternatively by using a trocar. Possible routes for percutaneous pseudocyst drainage are transperitoneal, retroperitoneal, transgastric, transhepatic and transduodenal approaches.

Despite recent developments in minimally invasive techniques and further progress in CT- and ultrasound-guided therapy, surgical drainage is still a principal method in the management of pancreatic pseudocysts. It traditionally includes internal and external drainage and excision. A surgical approach can be indicated in patients with: a) complicated pseudocysts, i.e. infected and necrotic pseudocysts; b) pseudocysts associated with pancreatic duct stricture and a dilated pancreatic duct; c) suspected cystic neoplasia; d) coexistence of pseudocysts and bile duct stenosis; and e) complications such as compression of the stomach or the duodenum, perforation and haemorrhage due to erosion of arteries or pseudoaneurysms. Timing of surgical intervention depends on maturation of the cyst wall. In chronic pancreatitis pseudocysts can be treated without any delay under the assumption that maturation of the cyst wall has already taken place and can thus withstand sutures, whereas optimal timing in acute or traumatic pseudocysts is more difficult.

Internal drainage is the method of choice for uncomplicated mature pseudocysts. Depending on the topographic anatomy, pseudocystogastrostomy is done for cysts directly adherent to the posterior wall of the stomach as the case with our patient. Small (<4cm) pseudocysts in the head and the uncinate process of the pancreas are eligible for pseudocystoduodenostomy and pseudocystojejunostomy can be performed for all other cysts including extremely large (>15cm) cysts. There is controversy as to whether pseudocystogastrostomy and pseudocystoduodenostomy are equivalent in their outcome: pseudocystogastrostomy has been reported to be simple, quick and less prone to infections, but tends to be associated with more frequent upper gastrointestinal bleedings. Pseudocystojejunostomy seems to be more popular and results are somewhat better than for pseudocystogastrostomy. Newell et al. found no significant difference in cyst recurrence,
morbidity or mortality between cystogastrostomy and cystojejunostomy but the duration of the operation and blood loss were less after cystogastrostomy.

Resection is an alternative procedure to internal drainage for chronic pseudocysts and indications include painful chronic pancreatitis, multiple cysts, gastrointestinal haemorrhage from pseudoaneurysm, common bile duct or duodenal obstruction and technical inability to drain pseudocysts located in the uncinate process. Resection is performed by different operation methods including partial left-sided pancreatectomy preserving the spleen if possible, or by partial right-sided pancreatectomy (Whipple's procedure, pylorus-preserving pancreatoduodenectomy, Beger's operation or Frey's procedure).

Due to continuing progress in laparoscopic techniques minimally invasive surgery offers new modalities in the treatment of pancreatic pseudocysts. Although laparoscopic pseudocystogastrostomy and pseudocystojejunostomy result in adequate internal drainage and minimal morbidity, experience is limited and long-term outcome of relevant studies is awaited.

External drainage is indicated for immature cysts with infected contents and for ruptured cysts. It hardly ever applies to patients with chronic pancreatitis unless the pancreatic cyst has developed after a superimposed attack of necrotizing pancreatitis. Both, operative and non-operative management are effective means for the resolution of pancreatic pseudocysts, as shown in various studies. In a work done by Usatoff et al. 112 patients with confirmed chronic pancreatitis underwent open operation, either by drainage, resection or a combination of both. The morbidity rate was 28% and the mortality rate was 1%. In 74% of patients pain was relieved and pseudocyst recurrence rate was 3%. Those data are compatible with cumulative data showing success rates from 70% to 100%, morbidity of 9–36% and a mortality of between 0% and 8%. Cyst recurrence was observed in 0–30% of the patients.

Compared with surgery, percutaneous cyst drainage avoids a major operation, but outcome and complication rates vary between studies. According to Adams and Anderson pseudocysts can be managed effectively by operation or percutaneous drainage and no significant difference in direct complications and subsequent operations due to complications was evident. On the other hand, percutaneous drainage was associated with a higher failure rate and the initial success rate was only 42% compared with 88% after surgery. Morbidity and mortality were increased in patients who underwent percutaneous drainage in another study. Percutaneous drainage is a useful tool for immature or infected cysts after acute pancreatitis, but it is of limited use and treatment benefit for pseudocysts related to chronic pancreatitis. In addition, recurrence rates are high and fistulas may form.

So far there are no studies available that directly compared success rates, morbidity and mortality of endoscopic therapy versus surgical intervention. Some studies favour the endoscopic approach as it is less invasive and is associated mostly with a shorter hospital stay, lower morbidity and lower mortality. However, one has to take into account that only selected patients can be managed endoscopically and surgical patients tend to be more critically ill.

Diagnosis is assessed by means of both CT scan and EUS. In case of a small cyst (<5cm) or the absence of secondary complications the strategy is to wait and observe. If size exceeds 5 cm and/or complications occur the cyst can be treated either surgically or endoscopically with equivalent outcome.

Conclusions:
Pancreatic pseudocysts are a known complication of acute and chronic pancreatitis. That following trauma is rare. Chronic pseudocysts over 8 weeks are less likely to resolve spontaneously and, as the risk of complications increases thereafter, treatment of large pseudocysts (>5cm) should not be postponed. Introduction of new and sensitive imaging techniques permits the detection of more pancreatic cystic lesions with better evaluation of adjacent structures. Exact classification of pseudocysts is an important index for both the determination of the actual number of pseudocysts and the implementation of therapeutic modalities.

Surgery is the traditional modality for treating pancreatic pseudocysts, with excellent results and low morbidity and mortality. Laparoscopic management has been reported with very encouraging results, but long-term follow-up has still to show equivalence to open surgery. It could be a diagnostic dilemma especially in trauma. Pancreatic pseudocysts – when and how to treat? is an important question to be answered.

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REFERENCES


