Pancreatology 17 (2017) 658–662

Contents lists available at ScienceDirect

Pancreatology

journal homepage: www.elsevier.com/locate/pan

Safety and efficacy of angioembolisation followed by endoscopic ultrasound guided transmural drainage for pancreatic fluid collections associated with arterial pseudoaneurysm☆

Surinder S. Rana [a, *], Amit Kumar [a, 1], Anupam Lal [b], Ravi Sharma [a], Mandeep Kang [b], Ujjwal Gorsi [b], Rajesh Gupta [c]

[a] Department of Gastroenterology, Post Graduate Institute of Medical Education and Research (PGIMER), Sector 12, Chandigarh 160012, India
[b] Department of Radio-diagnosis, Post Graduate Institute of Medical Education and Research (PGIMER), Sector 12, Chandigarh 160012, India
[c] Department of Surgery, Post Graduate Institute of Medical Education and Research (PGIMER), Sector 12, Chandigarh 160012, India

ARTICLE INFO

Article history:
Received 21 June 2017
Received in revised form
8 August 2017
Accepted 18 August 2017
Available online 19 August 2017

Keywords:
Acute pancreatitis
Walled off pancreatic necrosis
Gall stones
Transmural drainage
Self-expanding metallic stents
Portal hypertension
Pseudoaneurysm
Angioembolisation

ABSTRACT

Background and aims: Arterial pseudoaneurysms associated with pancreatic fluid collections (PFC's) are serious complication of pancreatitis. There is insufficient data on safety of endoscopic ultrasound (EUS) guided drainage in these patients.
Aim: To retrospectively analyze results of combination of angioembolisation followed by EUS guided transmural drainage of PFC's associated with pseudoaneurysms.
Methods: Retrospective analysis of data base of eight patients (all males; mean age: 36.9 + 9.2 years; age range: 26–51 years) who underwent angioembolisation of pseudoaneurysm followed by EUS guided transmural drainage of the PFC's.
Results: The median size of PFC was 6.5 cm (range 5–14 cm) with 7 patients having acute pancreatitis and one patient having idiopathic chronic pancreatitis. The etiology for acute pancreatitis was alcohol in 5 patients, trauma and gall stones in one patient each. Six patients had walled off pancreatic necrosis (WOPN) and 2 had pseudocysts. The pseudoaneurysm was located in splenic artery (5 patients), gastroduodenal artery (2) and short gastric artery (1). All patients underwent successful digital subtraction angiography followed by angioembolisation. EUS guided transmural drainage was successfully done through stomach in 7 patients and via duodenum in one patient. The PFC's resolved in 3.9 + 2.5 weeks with no recurrence of either PFC or bleed over a follow up period of up to 24 months. No significant complications were observed in any patient.
Conclusions: Arterial pseudoaneurysms associated with PFC's can be successfully and safely treated with combination of initial radiological obliteration of the pseudoaneurysm followed by EUS guided transmural drainage.

Introduction

Visceral artery pseudoaneurysms are uncommon but important and potentially lethal complication of acute and chronic pancreatitis that often requires surgery [1–3]. The mortality rate of untreated patients with bleeding visceral artery pseudoaneurysms is up to 90% [1–3]. Even surgical treatment of these pseudoaneurysms is associated with high morbidity and mortality as these patients are often hemodynamically compromised [1–4]. The pseudoaneurysm are formed because of the extension of the peripancreatic inflammation around the arterial wall and its subsequent enzymatic autodigestion or sometimes, a pancreatic pseudocyst directly erodes into a visceral artery, thus converting it into a large pseudoaneurysm [1,5,6].

With advancement in interventional radiology, transcatheter arterial angioembolisation of the arterial segment bearing pseudoaneurysm has emerged as the first line treatment with surgery

☆ Presented at oral session "Frontiers of Therapeutic EUS: Can Do, Might Do and Should Do?" at DDW 2017 held at Chicago, USA.

* Corresponding author.
E-mail address: drsurinderrana@gmail.com (S.S. Rana).
[1] Present affiliation: Department of Gastroenterology, Command Hospital, Lucknow, UP, India.

http://dx.doi.org/10.1016/j.pan.2017.08.002
1424-3903/

reserved for refractory cases [7–9]. Its wide spread use has dramatically reduced the mortality associated with visceral artery pseudoaneurysms. However, pseudoaneurysms associated with large and/or symptomatic pancreatic fluid collections (PFC) are a rare, unique as well as difficult to treat clinical problem as these patients will further require drainage for PFC's after successful angioembolisation of pseudoaneurysm [10,11]. Most of these combined cases have been earlier treated surgically [5,6]. However, there are some recent reports that have described successful endoscopic transpapillary drainage of pseudocysts following successful angioembolisation of pseudoaneurysms including one study published by us in 2013 [12–16].

PFC's are a heterogeneous group of collections with collections following acute necrotising pancreatitis having a variable amount of solid and liquid debris. These so called walled off pancreatic necrosis (WOPN) cannot be drained by transpapillary drainage alone as the small calibre of transpapillary endoprosthesis is insufficient to drain the solid debris and this inefficient drainage leads on to secondary infection [17,18]. Therefore, transpapillary drainage alone is contraindicated in patients with large pseudocysts (>6 cm) or in WOPN [18]. These patients are treated with endoscopic transluminal drainage alone or in combination with transpapillary drainage and studies have shown that it is a safe and effective minimally invasive therapy for WOPN as well as large pseudocysts [18]. The results of transluminal drainage in WOPN have further improved after adoption of more aggressive endoscopic drainage techniques such as larger tract dilation, placement of multiple stents and/or nasocystic catheter (NCC), aggressive irrigation, use of fully covered self-expanding metallic stents (FCSEMS)/lumen apposing metal stents (LAMS), combination of endoscopic with percutaneous drainage and direct debridement of necrotic tissue by direct endoscopic necrosectomy (DEN) [19–22]. Also, use of a step up approach initially involving less invasive drainage and irrigation techniques only and resorting to necrosectomy in non-responders only has been shown to have an excellent outcome with less adverse effects [23–26].

In presence of pseudoaneurysms, because of risk of bleeding, endoscopic transluminal drainage is contraindicated and therefore most of the patients with pancreatic fluid collections associated with acute pancreatitis having coexistent arterial pseudoaneurysm have been treated surgically [27–28]. These patients can also be treated by endoscopic ultrasound (EUS) guided transluminal drainage after successful angioembolisation of the bleeding pseudoaneurysms. However, the safety and efficacy of such combined approach has not been evaluated previously. Therefore, in this retrospective study, we analysed safety and efficacy of combination of angioembolisation followed by EUS guided transmural drainage of PFC's associated with arterial pseudoaneurysms.

Patients and methods

A retrospective analysis of the data base of patients with visceral artery pseudoaneurysms associated with symptomatic PFC's treated with combined angioembolisation followed by endoscopic transmural drainage at our institution over last two years was done. The fluid collections were classified as per the revised Atlanta classification [29]. An informed consent was obtained from all the patients before the procedure and the institute ethics committee granted approval for retrospective analysis (NK/3190/Study/8). Patients with pregnancy, age less than 18 years, presence of congestive cardiac failure, compromised pulmonary status coagulopathy, thrombocytopenia, not giving consent for procedure and distance of PFC being more than 1 cm from the gastrointestinal lumen were excluded. The patient details including demographics, presentation, underlying illness and predisposing factors, duration of illness, evaluation including endoscopy and radiologic investigations, management and outcome were retrieved and analysed. The patients first underwent angioembolisation followed by endoscopic transmural drainage.

Angioembolisation

It was performed after gaining arterial access through the common femoral artery and selectively cannulating the pseudoaneurysm bearing artery. The embolisation was performed by coiling method using microcatheter and microcoils. Check angiogram was performed following successful angioembolisation to check for any collateral vessel feeding the pseudoaneurysm. Following successful angioembolisation patient was kept under close observation for detection of rebleed. After 48 h, patient underwent *trans*-abdominal color Doppler and/or endoscopic ultrasound to detect recurrence of filling of pseudoaneurysm. Patients with symptomatic PFC's even after successful obliteration of pseudoaneurysm were further treated with EUS guided transluminal drainage.

EUS guided transluminal drainage

EUS guided drainage was performed by the method described by us earlier [22]. Briefly, EUS examination was done with a linear scanning echoendoscope (EG-3870 UTK linear echoendoscope, Pentax Inc., Tokyo, Japan or UCT180 linear echoendoscope, Olympus Optical Co Ltd, Tokyo, Japan) at a frequency of 7.5 MHz. On EUS, the size as well as the detailed morphology of the PFC as well as presence of any abnormal blood vessel was studied. After giving intravenous antibiotics, the procedure was carried out under conscious sedation using intravenous midazolam. The antibiotics were continued post-drainage, initially intravenously and, once oral feeding resumed, they were given orally till the complete resolution of the PFC. Patients were initially given intravenous ciprofloxacin and it was changed/continued as per the culture/sensitivity report of the aspirated material. The PFC was punctured with a 19-gauge needle and a 0.035-inch guide wire was introduced and coiled into WOPN under EUS guidance. The access site was dilated using an endoscopic retrograde cholangiopancreatography (ERCP) cannula or 4 mm biliary balloon dilator or a 6 Fr cystotome. The tract was further dilated up to 12–15 mm with a wire-guided hydrostatic balloon (CRE-balloon; Boston Scientific, Natick, MA, USA) and one to three 7/10 Fr double-pigtail stents, between 3 and 7 cm in length, were inserted into WOPN. In patients with significant solid debris, a 7-Fr NCC was also placed alongside the stents for irrigation.

The patients underwent a computed tomography (CT) of the abdomen 72 h after endoscopic drainage and the NCC was removed in patients who had symptomatic improvement and >50% reduction in size of PFC. Patients with new onset fever or worsening of existing symptoms with persistent WOPN on CT underwent repeat endoscopic transmural drainage under endoscopic and fluoroscopic guidance. The tract was further dilated and multiple 10 Fr stents were inserted. If after second session the PFC persisted with persisting symptoms, a decision for additional transmural drainage by stents, FCSEMS insertion, direct endoscopic necrosectomy or surgery was taken after reviewing repeat imaging findings, consultation with patient and his/her family, and interdisciplinary consultation with pancreatic surgeons.

In patients with symptomatic improvement and resolved PFC, ERCP was done to document pancreatic duct disruption. In patients with normal pancreatic duct, all stents were removed, whereas in patients with partial duct disruption, transpapillary bridging stent was placed that was subsequently removed along with transmural stents after documenting healing of disruption. In patients with