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Review

Percutaneous Cholecystostomy – A Safe Option in the Management of Acute Biliary Sepsis in the Elderly

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ABSTRACT

Percutaneous cholecystostomy (PC) has been used in the management of acute cholecystitis and biliary sepsis in patients with severe comorbidities where emergency cholecystectomy or open cholecystostomy are considered to carry prohibitive risks of mortality. We reviewed three consecutive cases of elderly patients with biliary sepsis presenting acutely to our unit who were managed successfully with this approach, and present herein these cases and a review of the literature.

1. Introduction

Acute cholecystitis (AC) is one of the most frequent causes for acute general surgical admission, with 50–70% of cases occurring in elderly patients.[1] The mortality risk for a single attack of AC increases exponentially with age from 2.8% in the general population to 11.4% in those over 80 years.[2] Treatment choice and timing must be individually tailored based on age, comorbidities and severity of disease at presentation. The majority of patients[3] respond to initial conservative management and subsequent definitive cholecystectomy. However, failure of conservative management can result in complications including perforation or gangrenous cholecystitis, often requiring emergency surgical intervention with reported mortality rates as high as 30%.[1,4,5] Another subgroup are profoundly septic and may have organ dysfunction at presentation and require consideration of emergency intervention. Alternative temporizing strategies to laparoscopic or open gallbladder surgery accordingly has a rationale in a subset of predominantly elderly patients presenting with life-threatening sepsis from gallbladder disease.

Percutaneous cholecystostomy was first described by Radder[6] in 1980, when he performed the first ultrasound guided PC for the drainage of a gallbladder empyema. Since then, several studies have confirmed the efficacy of this procedure.[7–11] Percutaneous cholecystostomy avoids the use of general anaesthesia, invasive surgery and attendant risk while effectively managing gallbladder disease in critically ill elderly patients. It may either be used as a definitive treatment or as a temporizing measure, allowing for medical optimisation prior to undergoing interval cholecystectomy.

2. Patients and Methods

In this report we present three cases seen in one month in this unit that were managed successfully with this approach (Table 1), and review of the relevant literature (Table 2). References for this review were identified through searches of PubMed, MEDLINE and Current Contents using the search terms "percutaneous cholecystostomy", "elderly" and "acute cholecystitis". References from all identified articles were investigated for relevance. Abstracts and reports from meetings were not included. Only papers published in English between 1978 and 2008 were included.

Each patient was admitted acutely to our institution: all were over 89 years of age, met the criteria for septic shock and had an ASA grade of III or above. All patients were considered to be of extremely high anaesthetic and surgical risk, due to a combination of their septic shock and complex medical comorbidities. Each patient was resuscitated and transferred to intensive care. Their septic shock was managed with a combination of intravenous antibiotics, and full system support. They all underwent emergency percutaneous cholecystostomy under radiological guidance within 12 h of admission. Cholecystostomy was performed, following informed consent, under local anaesthesia and using computed

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Table 1
Clinical and laboratory parameters pre- and post-PC in the three patients.

		On admission	24 h Post-PC	48 h Post-PC
Pt 1	Abdominal pain	Yes	None	None
	Temperature (°C)	39.5 °C	37.5	36.3
	Blood pressure (mmHg)	88/48 mmHg	108/76 mmHg	128/84 mmHg
	O_2 Saturation (%)	81%	93%	97%
	WCC × 10″ 9/L ($n = 4$–11)	9.6	17	12.4
	Bilirubin (umol/L) ($n = 3$–17)	57	43	36
	Alkaline phosphatase (IU/L) ($n = 35$–104)	197	170	151
	Gamma glutamyl transferase (IU/L) ($n = 5$–40)	105	97	65
	Ventilatory support	Mechanical ventilation:FiO_2 80%.	High-flow O_2 by facial mask	O_2 by Nasal Prongs
	Inotropic support	Nor-adrenaline: 14 mcg/min	None required	None required
Pt 2	Abdominal pain	Yes	Mild	None
	Temperature (°C)	37.8	36.8	37.7
	Blood pressure (mmHg)	97/42	140/77	135/82
	O_2 Saturation (%)	88% (PaO_2 7.4 kPa)	91%	93%
	WCC × 10″ 9/L ($n = 4$–11)	21.1	14.5	11.7
	Bilirubin (umol/L) ($n = 3$–17)	40	21	18
	Alkaline phosphatase (IU/L) ($n = 35$–104)	269	201	160
	Gamma glutamyl transferase (IU/L) ($n = 5$–40)	236	168	102
	Ventilatory support	Non-invasive ventilation (CPAP)	High-flow O_2 by facial mask	Not required
	Inotropic support	Not required	Not required	Not required
Pt 3	Abdominal pain	Yes	Yes	None
	Temperature (°C)	38.7	38.1	37.3
	Blood pressure (mmHg)	65/44	91/53	102/58
	O_2 Saturation (%)	87%	91%	93%
	WCC × 10″ 9/L ($n = 4$–11)	17.1	18.1	12.4
	Bilirubin (umol/L) ($n = 3$–17)	19	22	11
	Alkaline Phosphatase (IU/L) ($n = 35$–104)	115	90	75
	Gamma glutamyl transferase (IU/L) ($n = 5$–40)	11	14	12
	Ventilatory support	Mechanical ventilation, FiO_2 70%	Mechanical ventilation, FiO_2 40%	Nasal prongs
	Inotropic support	Nor-adrenaline: 10 mcg/min	None required	None

tomography (CT) or ultrasonography guidance. A 22G spinal needle was positioned transhepatically in the gallbladder and bile was aspirated and cultured. The Seldinger technique was used to place a pigtail catheter into the gallbladder. Following the procedure the patient was rescanned to verify the correct location of the cholecystostomy catheter. Each patient had a varying post-procedural course as described below. However, all 3 had an initial response to the procedure within 24 h, with resolution of pyrexia, normalisation of white cell count, restoration of blood pressure and pulse rate, reduced need for pressor medications and respiratory supports, and resolution of their abdominal pain.

The first case is that of an 89 year old man with a background of ischaemic heart and peptic ulcer diseases, and was ASA grade IV. He presented to our Emergency Department with a 48 h history of abdominal pain and vomiting, and suffered from a cardiopulmonary collapse secondary to septic shock. He required immediate intubation and mechanical ventilation along with inotropic support (nor-adrenaline 14 mcg/min, correction of coagulopathy and broad-spectrum intravenous antibiotics). Abdominal CT scan (Fig. 1) revealed a very large distended gallbladder with pericholecystic fluid and wall thickening. His common bile duct (CBD) measured 1.6 cm with a filling defect noted distally. He underwent CT-guided PC within 12 h of admission, without complication. Following PC he had a rapid clinical response: his sepsis was controlled, allowing withdrawal of mechanical ventilation and inotropic support within 24 h of the drainage. His WCC, Liver function tests, Coagulopathy, and Vital signs all settled (see Table 1). He was well enough to undergo an ERCP within 48 h of admission. He had a large CBD stone which was extracted and spincterotomy performed. His antibiotics were stopped on day 7, and he was discharged home well on day 28 with drain in situ. The drain was removed after 6 weeks. He has since had a yearly review and remains well. He suffered no complications from the PC procedure.

The second case, a 90 year old lady with ischaemic heart disease, obstructive airways disease and atrial fibrillation (ASA grade III), presented to our ED with severe abdominal pain and fever. On admission, she was pyrexial, hypoxic (PaO_2 7.4 kPa) and hypotensive (see Table 1). She underwent a CT demonstrating acute cholecystitis with no duct dilatation and an associated large bowel ileus (Fig. 2). She was transferred to the ICU where she required non-invasive ventilation. Ultrasound guided PC drainage was performed within 12 h. She made a rapid improvement within 24 h with restoration of blood pressure, withdrawal of CPAP, and resolution of her abdominal pain. Her clinical and laboratory parameters returned to normal within the next 48 h. She was discharged from ICU on day 3, and discharged home following drain removal at 4 weeks. She suffered no PC related complications. On yearly review she has had no further gastro-intestinal complaints.

The last case is that of a 91 year old lady whose medical comorbidities included chronic obstructive airways disease and hypertension, and she was ASA grade III. She also presented with abdominal pain and septic shock (see Table 1). Admission abdominal CT scan revealed a grossly distended and thick walled gallbladder (Fig. 3). The features were suggestive of acute cholecystitis with Mirizzi's syndrome, and localised perforation of the gallbladder. She required mechanical ventilation (FiO_2 70%) and inotropic support (nor-adrenaline 10 mcg/min). Urgent ultrasound guided PC was performed, without incident. Within 24 h her pyrexia and sepsis began to settle, and her LFTs began to normalise. Inotropic support was discontinued 18 h post-PC, and she was extubated 36 h post-PC. She was discharged from ICU 48 h post-procedure. However, on day 16 she developed a recurrent episode of sepsis with right sided abdominal pain. Cholecystostomy tubogram (Fig. 4) revealed multiple CBD stones and it was decided that she would ultimately require a cholecystectomy. She underwent the same successfully 4 weeks post-admission.