



GALL BLADDER PERFORATION: CASE SERIES

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(ABSTRACT) **Background:** Gallbladder perforation is a serious complication of acute cholecystitis. Its management has evolved considerably since its classification by Niemeier in 1934. This review summarises the evidence surrounding the natural progression of this condition and potential problems with Niemeier's classification, and proposes a management algorithm for the more complex type II perforation.

Methods: Data from a retrospective case series and a systematic review were combined. The case series included all patients with gallbladder perforations from 2015 to 2017. 12 patients (9 female and 3 male) were included. The most common gallbladder perforations were type II 6 out of 12 (50%) followed by type I 5 out of 12 (41.6%) and type III 1 out of 12 (8.33%). Perforation was associated with cholelithiasis in 10 out of 12 (83.33%) of patients, and the overall median mortality rate was 0%.

Conclusions: Gallbladder perforation should be reported according to the original Niemeier's classification to avoid heterogeneity in data (e.g. varying rates of perforation types). The algorithm proposed in this study aims to guide the management of complex type II gallbladder perforations to minimise subsequent morbidity and mortality.

KEYWORDS :**Background**

Gallbladder perforation is a rare but life-threatening complication of acute cholecystitis, with a reported mortality rate of 12-42%. In 1934, Niemeier classified the condition into three types: type I, acute perforation into the free peritoneal cavity; type II, subacute perforation with abscess formation; and type III, chronic perforation with fistula formation between the gallbladder and another viscus. Since the

original classification, diagnostic modalities and therapeutic options have evolved considerably. Despite this, the aetiology of this condition remains poorly understood and surgeons are often faced with diagnostic as well as therapeutic challenges in managing such cases. This case series study incorporates a experience of managing this condition, and proposes changes to the traditional classification.

Patient demographics, clinical features and management

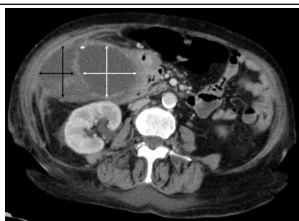
Patient no	Age	Gender	Clinical diagnosis	Type of perforation	Co morbidities	Day of definitive therapy	Management
1	76	m	AC	I	HTN	2	OC
2	54	f	AC	I	HTN	ELECTIVE	OC
3	70	f	Diverticulitis	I	Diverticulii disease	3	OC
4	56	f	AC	I	Vaginal fistula	2	OC
5	52	f	AC	I	Rheumatoid athritis	6	OC
6	72	m	Cholangitis	II	DM, HTN	13	Cholecystostomy+e lective oc
7	56	f	AC	II	HTN	7	OC
8	82	F	Pneumonia	II	Dementia	-	unfit
9	56	m	AC	II	DM, STROKE, ASTHAMA	2	OC
10	76	f	Perforated duodenal ulcer	II	-	2	OC
11	56	f	AC	II	HTN	2	OC
12	90	f	GASTRIC OUTLET OBSTRUCTION	III	HTN, DM, STROKE	-	unfit

CASE STUDIES

Over the study duration, 12 patients were treated for gall bladder perforation. The majority of patient had significant co morbidity. 5 patient had type I perforation, all have of which presented as acute abd pain requiring emergency laparotomy. 5 patients had pre operative diagnosis of gall bladder perforation based on radiological imaging. Out of 12, 10 patient undergo cholecystectomy. 6 patient were found to have type II perforation. patient 8 and 12 were unfit for surgery. Among 6 patient with type II perforation who

underwent open cholecystectomy, 2 were diagnosed intraoperatively and 4 preoperatively. 1 patient diagnosed with gastric outlet obstruction and was found to have gall stone penetrating through the grastic wall on gastroscopy. Subsequent radiological imaging confirm the presence of ileogastric fistula but the patient was unfit for surgery and so was manage conservatively.

Overall gall bladder perforation was diagnosed by usg, ct, MRCP, gastroscopy and intra operatively.



Computed tomography scan demonstrating perforation of the gallbladder (black arrows - bile collection; white arrows -gallbladder; asterisk- site of perforation).

Discussion

The incidences of type I and type II perforation were almost equal in the present series and similar in the systematic review.

The main difference between these two types is that type I perforation is a clinical diagnosis (e.g. in the form of peritonitis) assisted by radiology and its treatment is relatively straightforward in the form of urgent laparotomy (or laparoscopy) and cholecystectomy, or cholecystostomy. In contrast, the decision to treat type II perforations is far more complex due to the chronic nature of the perforation and the lack of consensus within the published literature about the most appropriate investigative or treatment modality. In addition, type II perforations are more likely to occur in older patients with greater comorbidities, and their questionable fitness for surgery often limits treatment options and poses challenges to the overall process of care. Since the earlier series cited in this review, advances in radiological imaging have allowed for more efficient preoperative diagnosis of type II perforation, facilitating the timely planning of treatment. However, the evidence still remains divided regarding the indications and efficacy of OC over percutaneous drainage (PD) for type II perforation.

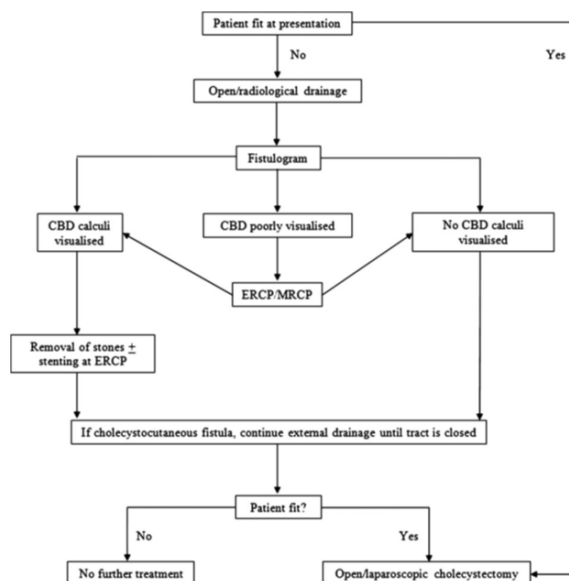
In 1985, Felice et al reported mortality rates following OC and PD as 8.6% and 22% respectively. The higher mortality in the latter cohort was attributed to the fact that PD was offered only to those patients who were unsuitable or unfit for OC. Huang et al in 2007 reported mortality rates after OC and PD as 50% and 0% respectively but no explanation was offered for the higher mortality after OC in this study.

The advancement of interventional radiological techniques since 1985 has undoubtedly contributed to the improved mortality rates in patients undergoing PD for type II perforations. In the present series, radiological drainage proved to be a valuable alternative to surgery in emergent situations for patients unfit or unwilling for surgery. Combining elements of current practice with the successful treatment processes described in recent studies, a simple algorithm for the management of type II perforation has thus been proposed.

In addition to the treatment modalities previously described, it is important for surgeons to consider a number of novel alternatives in patients who are unsuitable for cholecystectomy. These include ultrasound-guided transduodenal (or transgastric) gallbladder drainage with stenting and endoscopic transpapillary gallbladder stenting. These techniques have also been successfully employed when percutaneous transhepatic drainage or aspiration is contraindicated or anatomically challenging. However, although these techniques have demonstrated favourable mortality and morbidity rates, they are currently not offered in criticised by a number of studies to date. Fletcher and Ravdin modified the classification in 1951 to highlight more clearly the differences in mortality between the various clinicodemographic groups. Anderson et al and Ibrarullah et al independently reported case series of cholecystobiliary fistulae and labelled this phenomenon 'type IV' perforation. In contrast, Kochar et al suggested consolidating the various fistulas (i.e. cholecystobiliary, cholecystocutaneous, cholecystoenteric and cholecystohepatic) into the category of 'type III perforation' to avoid inconsistencies in reporting. Other studies have suggested other perspectives towards the type III component of the original classification. Anderson and Ibrarullah likened cholecystobiliary fistula to Mirizzi's type II syndrome, which was clearly described in 1948 and subsequently modified by McSherry et al, in 1982, into a 2-stage classification based on ERCP and percutaneous transhepatic cholangiography findings.

Cholecystoenteric fistula is similarly well described, and may result in gallstone ileus or Bouveret syndrome Unless bowel obstruction

ensues, it may be an incidental finding during cholecystectomy and may be amenable to laparoscopic or open surgery. 'Cholecystohepatic fistula' is a misnomer as fistulas form either between two hollow viscera or between a hollow viscus and the externa (i.e. the skin). This type of fistula is in effect a variant of type II perforation occurring in the presence of a partial or complete intrahepatic gallbladder rupturing 'intrahepatically', rather than intraperitoneally.



Conclusions

In conclusion, a rapid, multimodal diagnostic workup and accurate identification of the type of gallbladder perforation will aid clinicians in identifying the most effective means of managing patients with such pathology. For the more complex pathology of type II perforation, the simple algorithm proposed in this study aims to guide the investigative pathway and rapid delivery of treatment in order to minimise subsequent morbidity and mortality. The authors suggest adherence to the original Neimeier's classification when reporting data on gallbladder perforation in future studies, until new evidence forms a more thorough classification system.

References

- Niemeier DW. Acute free perforation of the gall bladder. *Ann Surg* 1934;99:922e4.
- Anderson BB, Nazem A. Perforations of the gallbladder and cholecystobiliary fistulae: a review of management and a new classification. *J Natl Med Assoc* 1987;79(4):393e9.
- Ibrarullah M, Saxena R, Sikora SS, Kapoor VK, Kaushik SP. Unusual gall bladder perforation: definition of a new type. *Indian J Gastroenterol* 1992;11(4):170.
- Swayne LC, Filippone A. Gallbladder perforation: correlation of cholescintigraphic and sonographic findings with the Niemeier classification. *J Nucl Med* 1990;31(12):1915e20.
- Huang CC, Lo HC, Tzeng YM, Huang HH, Chen JD, Kao WF, et al. Percutaneous transhepatic gall bladder drainage: a better initial therapeutic choice for patients with gall bladder perforation in the emergency department. *Emerg Med J* 2007;24(12):836e40.
- Wig JD, Chowdhary A, Talwar BL. Gall bladder perforations. *Aust N Z J Surg* 1984;54(6):531e4.
- Lee TH, Park DH, Lee SS, Seo DW, Park SH, Lee SK, et al. Outcomes of endoscopic transpapillary gallbladder stenting for symptomatic gallbladder diseases: a multicenter prospective follow-up study. *Endoscopy* 2011;43(8):702e8.
- Kawakubo K, Isayama H, Sasahira N, Nakai Y, Kogure H, Sasaki T, et al. Endoscopic transpapillary gallbladder drainage with replacement of a covered self-expandable metal stent. *World J Gastrointest Endosc* 2011;3(2):46e8.
- Itoi T, Sofuni A, Itokawa F, Tsuchiya T, Kurihara T, Ishii K, et al. Endoscopic transpapillary gallbladder drainage in patients with acute cholecystitis in whom percutaneous transhepatic approach is contraindicated or anatomically impossible (with video). *Gastrointest Endosc* 2008;68(3):455e60.
- Fletcher AG, Ravdin IS. Perforation of the gallbladder. *Am J Surg* 1951;81:178e85.
- Kochar K, Vallance K, Mathew G, Jadhav V. Intrahepatic perforation of the gall bladder presenting as liver abscess: case report, review of literature and Niemeier's classification. *Eur J Gastroenterol Hepatol* 2008;20(3):240e4.
- Mirizzi PL. Syndrome del conducto hepatico. *J Int de Chir* 1948;8:731e3.
- McSherry CK, Ferstenberg H, Virshup M. The Mirizzi syndrome: suggested classification and surgical therapy. *Surg Gastroenterol* 1982;1:219e25.