

CASE REPORT

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# Minimal access endoscopic debridement of right hepatic necrosis

Arun Nadarajah, Peter Hodgkinson, Jonathan Fawcett

## ABSTRACT

**Introduction:** Hepatic necrosis secondary to hepatic artery injuries can be devastating and will often require surgical debridement. Conventionally this is done as an open laparotomy with washout and debridement. We report the first case of significant hepatic necrosis for which a minimal access hepatic necrosectomy was performed via an endoscopic approach, hence reducing morbidity and mortality for the patient.

**Case Report:** A 63-year-old female with type 5 choledochal cyst underwent a left hepatectomy and Roux-en-y biliary reconstruction. This was complicated by an arterial injury with pseudoaneurysm requiring radiological embolization and subsequent right hepatic thrombosis leading to hepatic necrosis. She had a prolong intensive care unit (ICU) admission with percutaneous drainage and intravenous antibiotics for two months. A minimal access necrosectomy was eventually required as an elective day surgery procedure. The patient improved significantly and has been well apart from recurrent cholangitis from a possible hepatic duct stenosis from the initial hepatectomy.

**Conclusion:** Hepatectomies complicated post-operatively by infected hepatic necrosis can be successfully managed via minimal access hepatic necrosectomies. This has multiple benefits such as decreased hospital stay and quicker recovery time.

**Keywords:** Endoscopic, Hepatectomy, Minimal access, Necrosectomy

### How to cite this article

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## INTRODUCTION

Hepatectomy is a treatment of choice for various forms of liver pathologies such as malignant tumors, benign tumors, intra-hepatic calculi, hydatid disease, necrosis, and abscesses. Despite the livers' regenerative features, its surgical manipulation comes with significant post-operative morbidity and mortality risks which are 4.09–47.7% and 0.24–9.7%, respectively [1]. Hepatic necrosis secondary to arterial damage is a severe complication of hepatectomies which in most cases are further complicated by gram-negative sepsis. In conjunction these two negative factors carry a mortality rate of approximately 50% [2].

In this report we will discuss the first published case report of post-hepatectomy ischemia post-embolization resulting in hepatic necrosis which was successfully treated with minimal access necrosectomy. This is a hybrid between current advancements in technology and a pool of experience available within a multi-disciplinary team (MDT) of specialist in a well-equipped tertiary hospital.

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## CASE REPORT

A 63-year-old female underwent an elective left hepatectomy, cholecystectomy, and Roux-en-Y biliary reconstruction for a type 5 choledochal cyst at another facility (Figure 1: MRCP 20/01/14). Her past medical history includes gastroesophageal reflux, hypothyroidism, tonsillectomy, and tubal ligation. This procedure was indicated by stone formation and recurrent episodes of biliary obstruction from cholelithiasis. Unfortunately, the patient developed a pseudoaneurysm (embolized through interventional radiology) (Figure 2) and subsequent ischemic necrosis of the liver (Figure 3). She was intubated, ventilated, and placed on inotropic support and intravenous antibiotics. On day 12, she was transferred to Princess Alexandra Hospital's ICU (Brisbane, Australia) under the Hepatobiliary Team for further management.

She spent 3 out of 9 weeks in ICU. During her admission, she had a percutaneous pigtail drain placed into a necrotic collection of the right hemiliver (Figure 4). When her liver enzymes and abdominal pain improved she was discharged with the pigtail in situ on week 9. She later underwent an elective minimal access endoscopic debridement of right hepatic necrosis 77 days after the initial operation.

Upon extensive literature search, the authors have found that this minimal access endoscopic debridement of chronic hepatic necrosis is the first ever reported.

There has been a reported case study by Talar T. in 2007 where a laparoscopic debridement of hepatic necrosis was carried out, but not through this report specific minimal laparoscopic methods [3]. This procedure was done under General Anesthesia with an intra-op single dose of intravenous antibiotics. Access was gained via the pre-existing 14 Fr pigtail drain with the help of a guidewire, Nephromax (Flexima Locking Loop Nephrostomy Catheter—14 Fr M0064101430/Re-Entry Malecot Nephrostomy Catheter—14 Fr Catheter, 6 Fr) and 30 Fr sheath under radiological guidance. The necrosectomy was carried out successfully and a 19 blakes drain was sutured in place with a coloplast bag. This was a one-off procedure and repeats were not required. Operating time was 1 hour 16 minute and the patient was kept in overnight and discharged the next day.

The patient has recovered from her hepatic necrosis and now has normal ducts in segments 5 and 8 and abnormal dilated ducts in residual segments 6, 7, and 1 (Figure 5). She has experienced recurrent Klebsiella Cholangitis occasionally which has been treated conservatively with antibiotics as per a MDT meeting.



Figure 1: MRCP demonstrating the choledochal cyst pre-op (20/01/04).

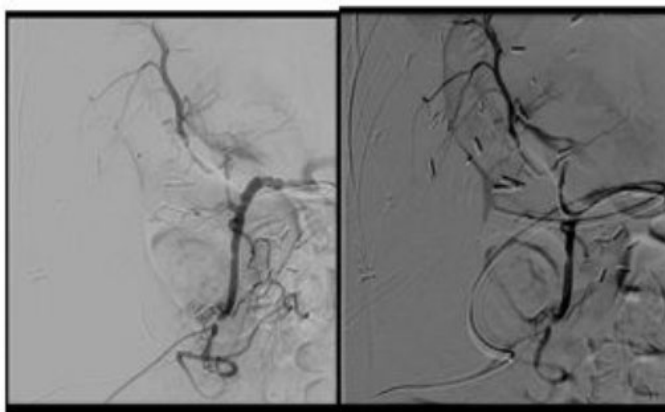


Figure 2: Angiogram after initial operation (13/04/14 – SC 12/ IM 12/SE 14/IM 14).

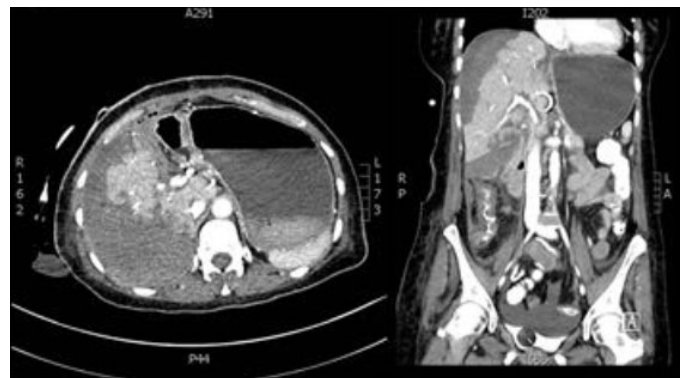


Figure 3: CT venous phase scan of abdomen showing extensive hepatic necrosis involving segments 6 and 7 and also peripheral areas of segments 8 and 5—Week 3.



Figure 4: CT scan of abdomen on insertion of percutaneous 14 Fr pigtail drain within right hepatic necrosis—Week 4.

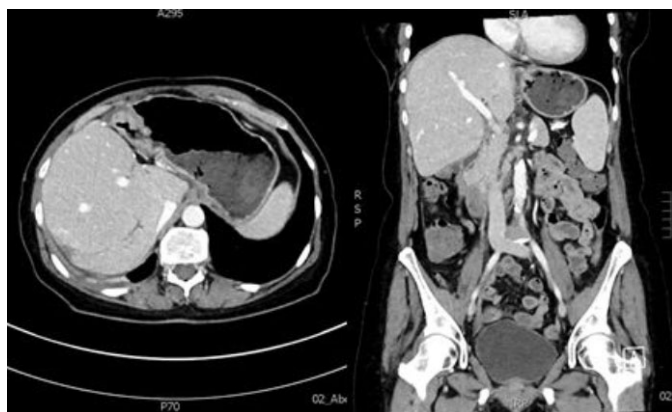


Figure 5: CT venous phase abdomen of resolved hepatic necrosis with hepatic hyperplasia—22 months (OPD follow-up).

## DISCUSSION

Liver resection is performed as treatment options for various disorders. Among several contributory factors technological advancements, surgical experience, and multi-disciplinary input had significantly improved post-operative outcomes following hepatectomies [4]. Hepatic necrosis compounded with sepsis is one of the more severe complications of a hepatectomy.

In this case study, the likely cause of hepatic necrosis is arterial injury leading to thrombosis during the initial elective left hepatectomy. A “step-up” approach was utilized where initial treatment was primarily conservative. This approach is similar to the relatively recent adaptation of minimal access pancreatic necrosectomies. The PANTER study performed in the Netherlands showed that there was a significant decrease in major complications using a “step-up” approach compared to open necrosectomies in the management of pancreatic necrosis [5].

Minimally invasive approaches have several proven advantages such as to lower morbidity and mortality [6], keeping an infection compartmentalized and reducing systemic inflammatory and septic response. Reduced pain, operation time, and admission duration are more advantages of a minimally invasive approach [6].

The patient in this case was a suitable candidate for the use of endoscopic instruments for minimal access hepatic necrosectomy as the procedure was performed after a 3-month delay similar to the laparoscopic approach mentioned by Talar et al. in 2007. This would have resulted in better demarcated borders between necrotic and healthy hepatic cells as well as less intra-operative bleeding.

## CONCLUSION

Infected hepatic necrosis is a severe complication secondary to hepatectomies. A step up approach with minimal access hepatic necrosectomy via “endoscopic” means can result in significantly less morbidity and

mortality for patients. We advocate that such an approach be carried out in a Tertiary Hospital with the availability of a Multi-disciplinary Team, involving Hepatobiliary Surgeons, Intensive Care Physicians, Interventional Radiologists, and others.

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## Author Contributions

Arun Nadarajah – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Peter Hodgkinson – Conception of the work, Design of the work, Acquisition of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Jonathan Fawcett – Conception of the work, Design of the work, Acquisition of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

**Guarantor of Submission**

The corresponding author is the guarantor of submission.

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**Consent Statement**

Written informed consent was obtained from the patient for publication of this article.

**Conflict of Interest**

Authors declare no conflict of interest.

**Data Availability**

All relevant data are within the paper and its Supporting Information files.

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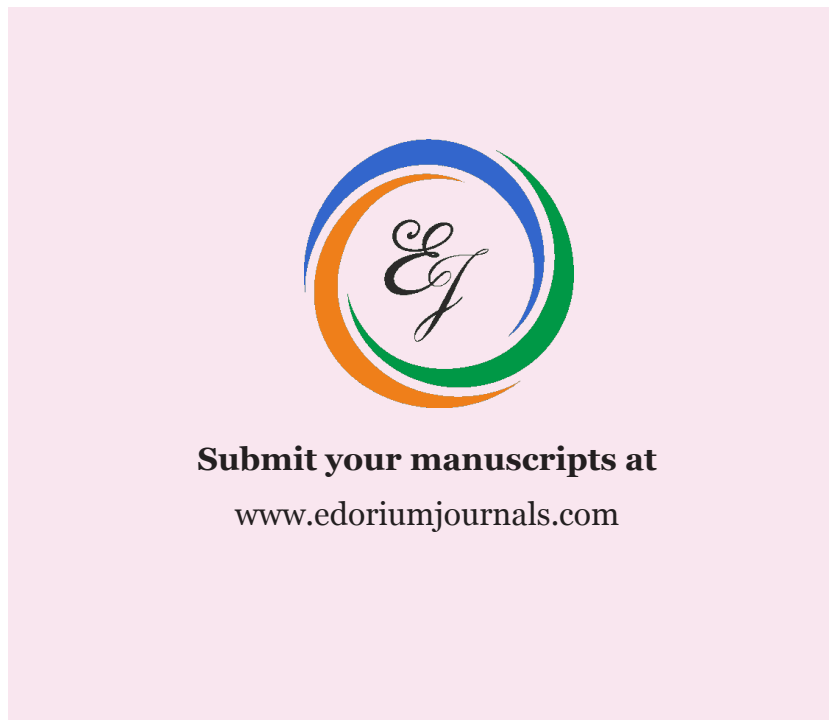
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