Hepatic arterioportal fistula following liver trauma: case series and review of the literature

Soroosh Noorbakhsh, MD, Lissette Gomez, MD, Yoo Joung, BS, Courtney Meyer, MD, Dustin S. Hanos, MD, Mari Freedberg, MD, MS, Nathan Klingensmith, MD, April A. Grant MD, Deepika Koganti, MD, Jonathan Nguyen DO, Randi N. Smith, MD, MPH, Jason D. Sciarretta, MD

Introduction

Hepatic arterioportal fistula (HAPF) is rare complication of severe hepatic trauma and can manifest with bleeding in the acute setting and sequelae of portal HTN months to years after injury.

This study aims to review cases of acute HAPF from our trauma center and outline the multidisciplinary approach to management of this life-threatening injury.

Methods

- Retrospective review from 01/2019 – 10/2022 at Grady Hospital
- >20,000 trauma admits → 1025 grade IV-V liver injuries →125 to IR → **5 acute HAPF**

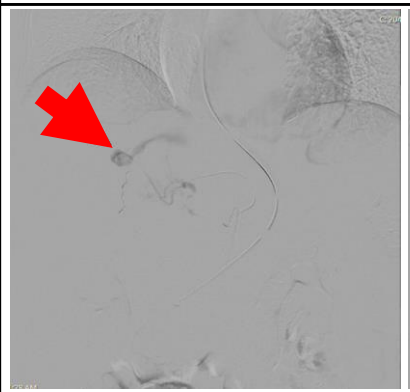


Fig. 1a Selective hepatic angiogram demonstrating HAPF involving middle hepatic artery (arrow).

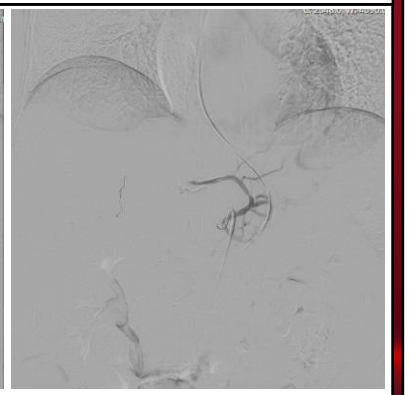


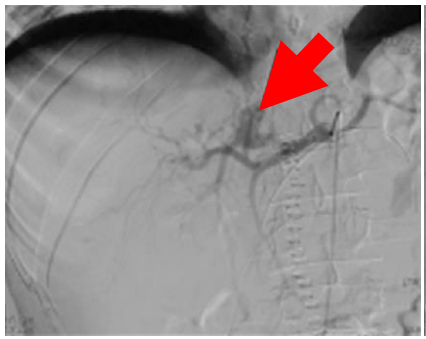
Fig. 1b Selective hepatic angiogram demonstrating successful Gelfoam embolization of previous HAPF.

Cases

- Total number of cases: **5 (incidence 4%)**
  - **4** penetrating (3x GSW, 1x KSW), **1** blunt (MVC)
- Cases requiring emergent surgery: **4**
  - Damage control: **3**
- Angiography with endovascular intervention: **5**
  - Gelfoam alone: **2**
  - Gelfoam with NBCA: **1**
  - Coil embolization: **2**
- Outcomes
  - Deaths: **2**
  - Discharge: **3 (<1 month LOS)**

Discussion

- **HAPF after trauma associated with significant liver injury**, needs surgery
- **Fistula itself is best managed using endovascular techniques**
- **Coil embolization, NBCA, and Gelfoam**; depends on anatomy
- Transarterial embolization complications: **liver necrosis** (14.9%), **bile leak** (11.5%), **abscess formation** (7.5%)
- Long-term complications: **portal HTN 2/2 to AV shunting** (abdominal pain, ascites, GI bleeding due to varices); **high-output cardiac failure**



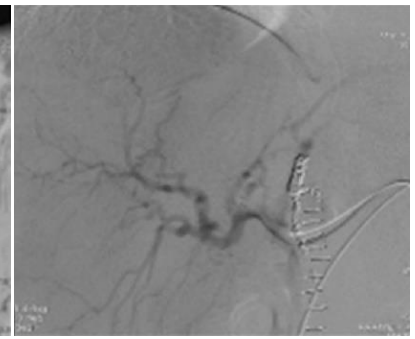


Fig. 2a Celiac artery angiography showing brisk filling of left portal vein (arrow) demonstrating APF.

Fig. 2b Coil embolization of left hepatic artery branch showing normal arterial flow without portal venous opacification

Conclusion

- Traumatic HAPF associated with significant liver injury
- Surgery often required for hemorrhage control
- Endovascular control of HAPF in high-grade liver injury is recommended
- Multidisciplinary approach is necessary to optimize care in the acute setting

Disclosure

NIH T32 Grant in Critical Care, NIGMS (5T32GM095442-12).

References

1. Ibn Majdoub Hassani K, Mohsine R, Belkouchi A, Bensaid Y. Post-traumatic arteriovenous fistula of the hepatic pedicle. J Visc Surg. Oct 2010;147(5):e333-6. doi:10.1016/j.jviscsurg.2010.09.001
2. Kumar A, Ahuja CK, Vyas S, et al. Hepatic arteriovenous fistulae: role of interventional radiology. Dig Dis Sci. Oct 2012;57(10):2703-12. doi:10.1007/s10620-012-2331-0
3. Hirakawa M, Nishie A, Asayama Y, et al. Clinical outcomes of symptomatic arterioportal fistulas after transcatheter arterial embolization. World J Radiol. Feb 28 2013;5(2):33-40. doi:10.4329/wjr.v5.i2.33
4. Green CS, Bulger EM, Kwan SW. Outcomes and complications of angioembolization for hepatic trauma: A systematic review of the literature. J Trauma Acute Care Surg. Mar 2016;80(3):529-37. doi:10.1097/ta.0000000000000942