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HEPATIC EMBOLIZATION IN NON-OPERATIVE MANAGEMENT OF LIVER TRAUMA IN CHILDREN: A CASE REPORT.

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Background

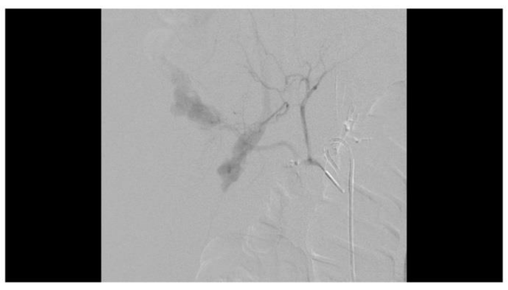
Management of liver injury has evolved from obligatory operative to non-operative management. Hepatic embolization has been an effective method in controlling bleeding from liver injury but not without complication of vascular occlusion. Multiphase computed tomography (CT) scan is the modality of choice in detecting this complication.

Purpose

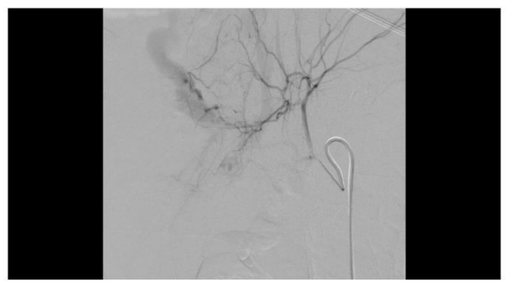
This paper review on the efficacy and complication of hepatic embolization and the concerns of multiphase CT scan in traumatic liver injury in children.

Case Description

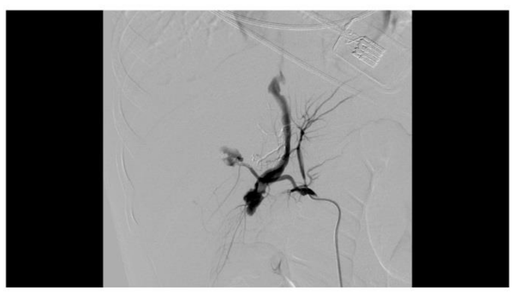
9 years old girl transferred to our unit, post trauma 18 hours, alleged motor vehicle accident sustained grade 4 liver injury with right closed comminuted fracture of tibia fibula fracture. She was hemodynamically stable under room air and abdomen is soft and not distended on admission. Post trauma day 2, her abdomen become distended and tense. Hepatic angiography performed. It showed contrast blush from segmental branch of left hepatic artery and embolized with glue. There is also contrast blush from right hepatic artery with fistula to hepatic vein and inferior vena cava, coil inserted and glued.



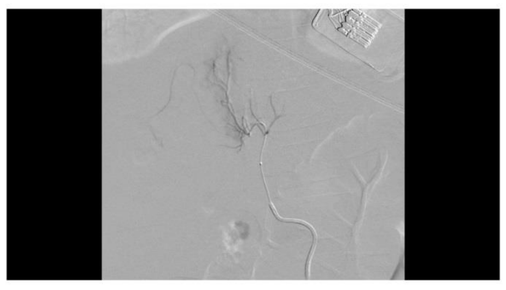
1. Common hepatic artery angiogram: Fistulous communication between segment IV left hepatic artery and right hepatic artery with right portal vein, right hepatic vein and IVC.



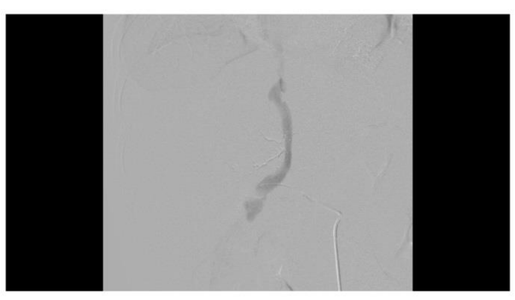
2. Left hepatic artery angiogram (pre-embolization)



3. Common hepatic artery angiogram (post segment IV left hepatic artery embolization):



4. Left hepatic artery angiogram (post-segment IV of left hepatic artery embolization)



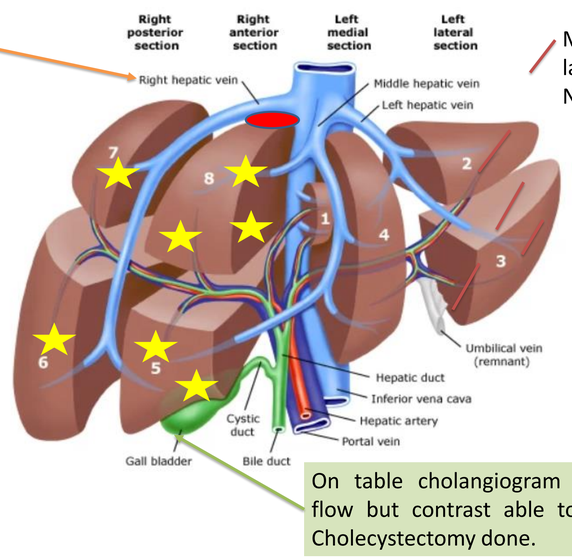
5. Selective right hepatic artery angiogram (post embolization of segment IV left hepatic artery): Fistulous connection between right hepatic artery and the right portal vein as well as the intrahepatic IVC.

6. Right hepatic artery angiogram post embolization (coiling) of fistula of right hepatic artery-right portal vein and intrahepatic IVC.

Post embolization noted she has persistent fever and raised liver enzymes. Proceeded with multiphase CT scan of liver. It showed devascularisation of right liver lobe with necrotic changes and abrupt truncation of proximal right portal vein. She underwent surgery. Intra –operative findings as shown below. Post operatively, her condition stable and liver enzymes improving.

Right hepatic vein injury with continuous bleeding near the inferior vena cava. Primary repaired done. EBL 1.1L.

★ Multiple lacerations at right lobe of the liver and necrosed. Non anatomical right hepatectomy done.



Multiple superficial laceration at left lobe. No active bleeding.

On table cholangiogram showed no proximal flow but contrast able to flow to duodenum. Cholecystectomy done.

Discussion

Trauma is the leading cause of death in children. Abdominal trauma accounts 8% of blunt trauma injuries. The liver, spleen and kidney are the primary organs affected. Liver trauma is a devastating injury due its high vascularity. Combination of physical examination, serum transaminases and Focused Assessment with Sonography in Trauma (FAST) are adequate to assess severity of liver trauma in pediatric patients. Computed tomography scanning and unnecessary radiation exposure can be avoided.(1) Non operative management of intra- abdominal injury represents the standard care for pediatric patients. Management of isolated solid organ injury (SOI) in children is adopted from guidelines by American Pediatric Surgical Association.(2) The decision to intervene operatively for a solid organ injury should be based on the physiologic response to the identified injury rather than on the anatomic severity of injuries. However, management guidelines, including post discharge activity limitations are based on the anatomic grade of the injury. (3) A recent systemic review published in August 2019 proposed that prophylactic embolization of SOI in stable patients with confirmed arterial extravasation is not indicated and only done in patients with evidence of ongoing hemorrhage. (4) Angiographic embolization is an useful non-operative adjunct in the treatment of pediatric liver injuries, but seldom indicated. Moreover, bile leak is the most common liver-related complication. (5) In our case, patient was transferred from other hospital with no pediatric surgery specialty. On day 2 of admission, hepatic angiography was decided in view of patient's hemodynamic instability. Angiography was chosen as it reveal better image on the liver vascularity. Angiographic embolization was performed when a contrast blush is seen on the scan. (6) Post embolization, patient was noted ill with raised liver enzymes. The presumed diagnosis was that the vascularity of the liver has been compromised. The thoughts were coil migration or occlusion of nonselective embolization causing the vascular compromise. Coil migration has been reported as a complication that can contribute to rebleeding after successful embolization. (7) Multiphase CT scan was done prior to our surgery to review more detailed images of the injury. There is a concern regarding the long term risk of ionizing radiation exposure and administration of anesthetic drugs to young children. These concerns can be mitigated using advanced CT techniques by consolidating multiphase imaging protocols into a single phase which can decrease scan time and radiation dose while preserving image quality. (8) The standard care for blunt liver and splenic injury in hemodynamically stable patients has gradually shifted to operative to non-operative management (NOM). However, surgical treatment is still indicated in unstable patients not responder to fluid resuscitation and in cases of failure of NOM. (9) Lobar resection is indicated in a case of large devitalized liver portions. (10)

Conclusion

Hepatic embolization is a method of non-operative management in traumatic liver injury and it carries risk of vascular compromise. Multiphase CT scan was done to visualise the hepatic vascularity for better control of situation during surgery.

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