



Traumatic Injury of Portal Vein

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Patient Presentation

A 19-year-old man, who was thrown from his motorcycle and collided with a utility pole during a traffic collision, was admitted to our emergency department (ED). His vital signs were temperature, 37.1°C; pulse rate, 102 beats/min; respiration rate, 18 breaths/min; and blood pressure, 110/67 mmHg. A physical examination revealed abdominal distension with epigastric pain and rebound tenderness. Shock and abrasions involving the four extremities without active hemorrhage were observed. We used focused

assessment sonography for trauma and detected fluid accumulation in the hepatorenal recess. Laboratory results showed high serum glutamic oxaloacetic transaminase and amylase levels. Computed tomography (CT) revealed a large hematoma with contrast extravasation at the mesenteric root with extensions around the main portal vein (PV) and right retroperitoneal space (Fig. 1). The superior mesenteric vein (SMV) and main PV were encased by the hematoma (Fig. 2).

Owing to hemoperitoneum and hypovolemic shock, emergency exploratory laparotomy was arranged; it revealed a PV laceration with active bleeding over the infrapancreatic area and a blunt injury of the pancreatic uncinate process, which was classified

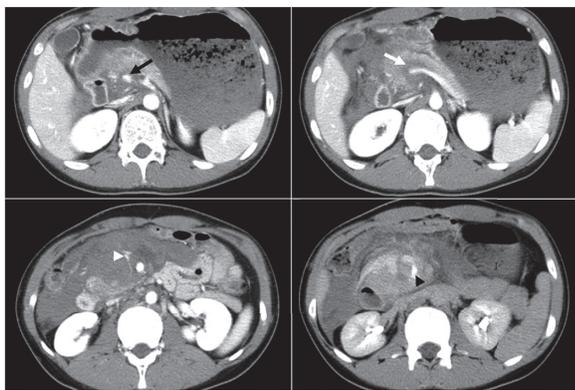


Fig. 1. Abdominal computed tomography (CT) with contrast, axial view. (A) Decreased diameter of portal vein (PV) (black arrow) which was encased by surrounding hematoma. (B) A hematoma was over right upper quadrant of abdomen, with unapparent PV confluence of splenic vein (white arrow). (C) Contrast medium extravasation with massive hemoperitoneum (white arrow head). (D) Delayed phase, contrast medium extravasation (black arrow head) around PV.

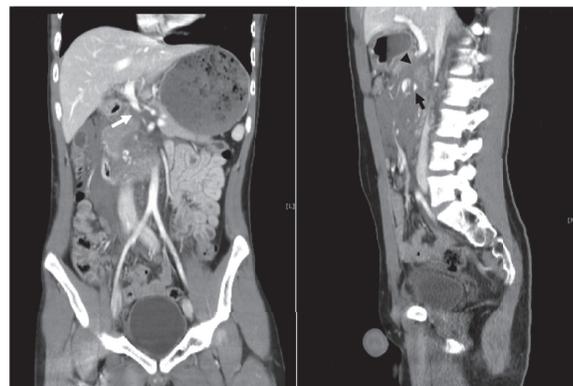


Fig. 2. Abdominal computed tomography (CT) with contrast, sagittal and coronal view. (A) Coronal view, hemoperitoneum, interruption of portal vein (PV) with luminal narrowing (white arrow), and pancreatic injury. (B) Sagittal view, PV was encased by hematoma (black arrow head), and contrast medium extravasation (black arrow).

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as a grade II injury according to the American Association for Surgery of Trauma. A Whipple operation was conducted. The patient survived and is currently under regular follow-up.

Discussion

The PV is adjacent to the pancreas and forms a confluence with the SMV, inferior mesenteric vein, and splenic vein. The average diameter of and blood pressure in the PV are 2 cm and 10 mmHg, respectively. Traumatic injury to the PV (TIPV) causes significant exsanguination at high flow rates (1 L/min on average). TIPV is rare (approximately 0.1% of all major trauma cases) and may cause hemorrhagic shock in 77% of patients.¹ Penetrating injury is the commonest cause of TIPV; however, relatively few cases of blunt-trauma-related TIPV are observed. However, TIPV may occur with associated injuries to adjacent organs (the liver, pancreas, and bowels), which contribute to massive blood loss.^{2,3} Survival rates in TIPV are variable. Survival rates of 38% and 8%, respectively, were reported in PV injuries and injuries to other structures in the portal triad.⁴ Furthermore, mortality was higher in patients with hypovolemic shock and active hemorrhage at admission.² TIPV diagnosis primarily requires imaging studies. In our patient, CT revealed hematoma, encasement of the PV, SMV, and mesenteric vein root, with PV narrowing and contrast extravasation. Emergency surgery was the patient's only chance of survival if circulatory collapse occurred.^{2,4} According to the literature, a definite TIPV diagnosis usually requires laparotomy. Standard treatments of TIPV consisted of venorrhaphy and vessel ligation. Due to massive hemorrhage from PV and pancreatic uncinate process during our emergency laparotomy, the pancreas was hemiresected accompanying Whipple procedure to control hemorrhage.

Physicians should be aware of rare and obscure fatal injury types because numerous traumatic injury cases are observed in EDs. TIPV is serious and difficult to determine through CT; it may be diagnosed only through laparotomy. A hematoma-encased PV exhibiting narrowing and contrast extravasation in the CT examination and the rapid deterioration of hemodynamics confirmed the diagnosis. Early life-saving interventions resulting from TIPV awareness can facilitate TIPV

management. Although injury management does not correlate exactly with injury scales, the scales are a practical means for indicating injury severity.

Conflicts of Interest Statement

All the authors declared that there is also no conflicts of interest regarding the publication of this article.

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Ethics and Consent

Not applicable. This article is an image report which does not include human experiment and any privacy information of patient. Based on the Institute Reviewed Board policy and regulars, the Institute Reviewed Board did not need to oversee manuscripts of an image report. The identity of our patient has been removed and deleted carefully in this article to ensure the patient's privacy and rights.

References

1. Gupta A, Stuhlfaut JW, Fleming KW, Lucey BC, Soto JA. Blunt trauma of the pancreas and biliary tract: a multimodality imaging approach to diagnosis. *Radiographics* 2004;24:1381-1395. doi:10.1148/rg.245045002
2. Asensio JA, Demetriades D, Hanpeter DE, et al. Management of pancreatic injuries. *Curr Probl Surg* 1999;36:325-419. doi:10.1016/S0011-3840(99)80003-3
3. Buckman RE, Pathak AS, Badellino MM, Bradley KM. Portal vein injuries. *Surg Clin North Am* 2001;81:1449-1462. doi:10.1016/S0039-6109(01)80017-7
4. Kama A, Coskun S, Yuksel M, Yildirim AC, Gunal E, Cıgısar G. Traumatic laceration of the portal vein. *CJEM* 2016;18:306-308. doi:10.1017/cem.2015.12