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AN UNUSUAL CAUSE OF PELVIC HEMORRHAGE: MULTIDETECTOR CT DIAGNOSIS OF INFERIOR MESENTERIC VEIN INJURY

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Pelvic trauma can lead to uncontrollable bleeding and even death. Although significantly decreased with the application of novel treament modalities and the use of state-of-the-art imaging equipment, pelvic trauma and subsequent bleeding remains to stay as a major source of morbidity and mortality. In this case we present a patient suffering from pelvic bleeding from the inferior mesenteric vein due to sigmoid mesocolon injury. Similar finding has not been reported as an isolated source of pelvic hemorrhage. We also propose that the routine use of reformatted images obtained with multidetector CT scanners in patients with hemoperitoneum may be a highly useful adjunct for the correct identification of the source of hemorrhage.

Key-words: Pelvic organs, hemorrhage – Veins, mesenteric – Veins, injuries.

Pelvic hemorrhage is a well-known clinical phenomenon, most commonly seen after pelvic trauma, freqently associate with the fractures of the osseous ring of the pelvis. In patients with pelvic fracture it is of utmost importance to look for any signs of hemorrhage. The source of bleeding in the affected patients is generally the venous structures, however arterial structures may also be the culprit abnormality in these patients.

In this paper, we present and discuss the imaging findings of a patient with pelvic hemorrhage from inferior mesenteric vein (IMV) due to sigmoid mesocolon injury. To the best of our knowledge, IMV as a source of pelvic bleeding has not been reported before.

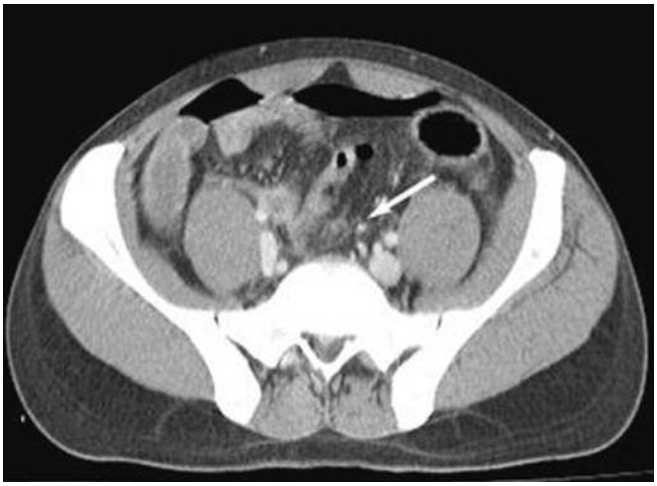

Fig. 1. — Axial contrast-enhanced MDCT of the patient reveals inferior mesenteric vein at the level of pelvic inlet (arrow). Also note the hemorrhage in pelvis.

Case report

Thirty year-old male patient admitted to the emergency department after a car accident where he was the driver. At the admission the patient was fully conscious and well-oriented. The blood pressure from the left arm was 100/60 mm Hg. The patient was primarily complaining from excruciating diffuse abdominal and facial pain. The physical examination could not be systematically performed and brief examination of the abdomen revealed diffuse tenderness and an adequate examination could not be realized. The examination of the face was also found to be suggestive for several fractures by the emergency physician. Then the patient was transferred to the radiology unit of emergency room for CT imaging (by 4-MDCT, Siemens Medical System) of head, thorax and abdomen. The patient was found to have several fractures at the fascial bones as well as diffuse bilateral lung contusion. Abdominal imaging was the most striking among these examinations, disclosing diffuse intraperitoneal free air and pelvic free fluid suggestive of hemorrhage and perforation (Fig. 1). No lacereation or bleeding was detected in the abdominal solid organs. Coronal and sagittal reformatted MDCT images were reconstructed from raw data, revealed the IMV as the source of bleeding (Fig. 2). Subsequently the patient was transferred from the CT suit to the operating room. At the surgery, the patient was found to have focal lacerations at the sigmoid colon and ileum. He was finally treated with limited sigmoid colon resection and primary repairing of the small bowel. The pelvic hemorrhage was also detected perioperatively and the bleeding vessels were cauterized. The post-operative course was uneventful and he was also operated for his facial fractures several days after the abdominal surgery.

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Fig. 2. — Coronal (A) and sagittal (B) curved planar reformatted MDCT images clearly demonstrate inferior mesenteric vein (arrowhead) and injury (white arrow) and increased density in the sigmoid mesocolon consistent with hemorrhage (black arrows). The interruption of the inferior mesenteric vein at the level of pelvic hemorrhage can also be nicely depicted (white arrow).

Discussion

Pelvic trauma and subsequent hemorrhage remain to be a significant contributor to the mortality and morbidity of trauma victims. The complex nature of these injuries may pose challenging problems to the attending emergency physicians and surgeons, and the radiologists as well. Mortality rates due to pelvic trauma and bleeding have dramatically decreased secondary to prompt and more concise diagnostic and treatment modalities (1-3).

Pelvis is a highly vascularised portion of the abdomen comprising several arteries and veins, where iliac vessels are the leading ones. Hematoma after pelvic trauma, particularly with associated osseous fractures, may reach to substantial sizes that may jeopardize the hemodynamic stability of the trauma victims. Several underlying pathophysiological processes may play role as the source of bleeding, namely, the arteries, veins and the bony structures. Arterial bleeding is the result of interruption of the vessel wall integrity, while the venous bleeding is particularly from the posterior venous plexus with the same pathophysiology. Bleeding from cancellous bone may also give rise to life-threatening hemodynamic instability (4). Considering the differing treatment modalities in various clinical scenario, correct identification of the source of the bleeding may be highly useful adjunct for choosing the ideal treatment. Although arterial bleeding is more frequent in life threatening bleeding, venous structures are reported to be the commonest source (90%, mostly from presacral and prevesical veins), while arterial bleeding is much less common (10%, trunk or distal lesions) (5, 6). However, it must be kept in mind that all three mentioned pathophysiologic mechanisms may act at the same time during the process. Arterial injuries are best managed by endovascular embolisation, while venous bleeding are generally tried to handle with some form of tamponade. It is generally believed that high energy trauma with the loss of pelvic integrity is the most risky occurrence for a massive pelvic hemorrhage, however this assumption has not been confirmed by some other reports (4).

In this manuscript, we tried to explain the role of CT and the isotropic reformatting ability of new generation multidetector CT equipment in the correct diagnosis of the source of pelvic hemorrhage. Interestingly, this patient did not have any imaging or clinical evidence of disruption of pelvic osseous integrity and the laceration of inferior mesenteric vein probably occurred due to accleration-deceleration injury. We think that the application of reformatted images may be highly useful for the depiction of the injured vessel and may promptly facilitate the application of adequate and relevant application of treatment.

This case is also unique considering the lacerated vessel. Inferior mesenteric vein, to the best of our knowledge, has not been reported before as the only source of pelvic bleeding. The use of reformatted image was a strong contributor for

reaching the correct diagnosis in the presented subject and we think that it will be highly useful to use them on a routine basis in order to identify the correct site of vascular injury in trauma victims having pelvic hemorrhage. With the development of highly versatile and easy-to-apply softwares these images can also be created even before the departure of the patient from the imaging suit and the physicians in charge would be effectively and promptly oriented to the main pathology. With the correct identification, the treatments will be right to the target and the invaluable time would not be lost in the triage and treatment process.

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