

CASE REPORT

Traumatic Small Bowel Injury: A Diagnosis Challenge

MOHAMED SALEEM SAK, MOHD SAIBOON I

Department of Emergency Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia

ABSTRAK

Kecederaan usus kecil adalah komplikasi yang jarang berlaku berikutan trauma bahagian abdomen yang tumpul. Kami menghadapi kes kecederaan usus kecil berikutan kemalangan kenderaan bermotor yang pada mulanya terlepas pandang semasa pemeriksaan pertama kerana tiada penemuan luar biasa dalam pemeriksaan. Pesakit telah kembali lima hari kemudian dengan iskemia usus dan diuruskan dengan sewajarnya. Ini adalah satu cabaran dalam mendiagnosis kecederaan kerana simptom awal yang tidak jelas. Imbasan 'Penilaian Berfokus dengan Sonografi untuk Trauma' (FAST) digunakan sebagai alat saringan di Jabatan Kecemasan untuk mengenalpasti kecederaan abdomen mempunyai batasan, terutamanya dalam mendiagnosis perforasi usus kecil setelah trauma tumpul. Fasa awal kecederaan usus kecil selepas trauma abdomen tumpul jarang memperlihatkan cecair bebas yang ketara semasa imbasan sonografi FAST. Adalah mustahak bagi doktor kecemasan untuk mempunyai kecurigaan yang tinggi dalam kes berisiko tinggi untuk memberikan rawatan sokongan dan rujukan awal kepada pasukan pembedahan. Ini adalah kerana penangguhan rawatan akan menyebabkan komplikasi yang serius yang akan memberi kesan kepada morbiditi dan mortaliti pesakit. Kesimpulannya, setiap kes perlu ditentukan secara berasingan untuk menentukan pengimejan yang sesuai. Tomografi komputer (CT) pada bahagian abdomen adalah kajian yang lebih superior berbanding dengan imbasan sonografi dan perlu dilakukan kepada pesakit dengan indeks kecederaan yang tinggi.

Kata kunci: diagnosis, kecederaan, ultrasonografi

ABSTRACT

Traumatic small bowel injury is rare complication following a blunt abdominal

Address for correspondence and reprint requests: Syed Abdul Kader Mohamed Saleem. Department of Emergency Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia. Tel: +6012-6443106 Email: syed_mosleem@yahoo.com

trauma. We encountered a case of small bowel injury following a motor vehicle accident that was initially missed during the first presentation due to unremarkable findings in examination. Patient re-presented five days later with bowel ischaemia and was managed accordingly. It is a challenge in diagnosing the injury due to its vague presentation. The usage of Focused Assessment with Sonography for Trauma (FAST) scan as a screening tool in Emergency Department to pick up intra-abdominal injury do have limitations especially in diagnosing small bowel perforation post blunt abdominal trauma. The early phase of small bowel injury post blunt abdominal trauma rarely produces significant free fluid during the FAST scan. It is paramount for the emergency doctors to have a high level of suspicion in high risk cases to provide early supportive treatment and early referral to surgical team. If left undiagnosed bowel ischaemia may lead to catastrophic complication affecting the patient's morbidity and mortality. In conclusion, each case should be managed and risk stratify individually. Computed tomography abdomen is found to be more superior in detecting bowel injuries, hence, and investigation of choice compared to bedside ultrasonography in cases with high level of suspicion.

Keywords: bedside ultrasound, diagnosis, trauma

INTRODUCTION

Blunt abdominal trauma post motor vehicle accident is one of the common presentations to Emergency Department (ED) (Gad et al. 2012). Amongst the intra-abdominal injuries, the incidence of small bowel injury post blunt abdominal trauma are far less common, estimated to be around 5-15% of total cases. Though the incidence is low, recognising this injury is vital as it may lead to catastrophic outcome if missed. To ascertain the diagnosis of small bowel injury is a great diagnostic dilemma. Patients' initial presentation are usually vague. High index of suspicion in high risk cases can be ascertained with an in-depth history taking and examination that helps in determining the effective investigation for the patients.

CASE REPORT

A 22-year-old male, motorcycle rider, presented to ED with abdominal pain post motor vehicle accident. He was hit directly by the car's bonnet on his abdomen. On arrival to ED, patient was able to ambulate on his own to the consultation room. Vital signs on arrival were stable with blood pressure (BP) of 111/79 mmHg, heart rate (HR) of 89 beats/min and oxygenation saturation (SpO₂) of 99% on room air. Initial examination showed mild tenderness on the epigastric and periumbilical area with minimal bruises around the umbilicus. Patient was given intramuscular diclofenac 75 mg and proceeded with chest radiograph which showed no evidence of perforated viscus such as air under the diaphragm. Focused Assessment with

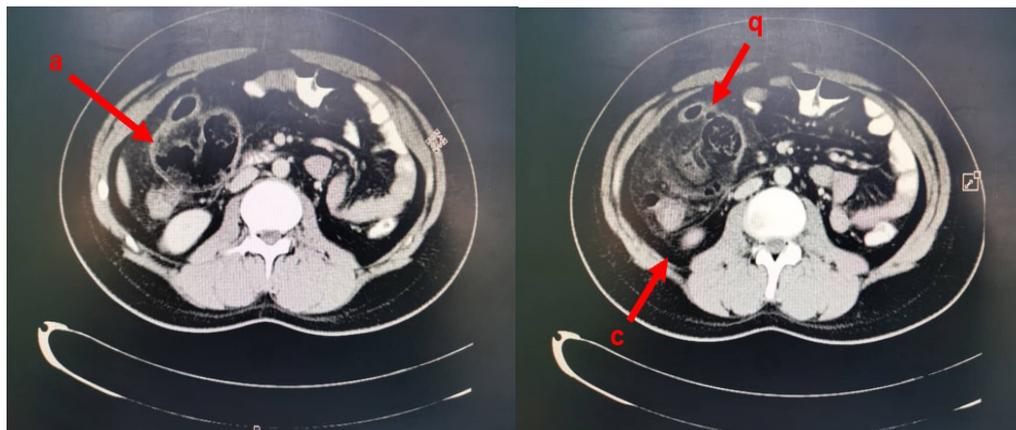


Figure 1: CT abdomen showed dilated loop of terminal ileum at right iliac fossa with fecal intraluminal appearance suggestive of sub-acute bowel obstruction (a) with free air at superior aspect of this loop (b) as well with free fluid seen in right paracolic gutter (c).

Sonography for Trauma (FAST) scan was conducted to look for evidence of intrabdominal fluid collection which was negative. Patient was discharged home following reduction in pain score post observation for 1 hour with analgesia.

Patient presented again at the ED on day-5 post trauma with abdominal pain and vomiting. The abdominal pain was localised on the epigastric region, dull aching in nature, non-radiating and not resolving with analgesia. Otherwise, he denied of having fever, no abdominal distension and had normal bowel opening daily. Patient was clinically dehydrated and lethargic looking. His vital signs were stable on arrival with BP of 128/77, HR: 99/min, SpO₂: 99% on room air. Abdominal examination showed minimal bruises at the epigastric region with tenderness and guarding at epigastric and umbilical region with sluggish bowel sound. Haemoglobin repeated three times within 5 hours were static at 14 g/dL and serial FAST scans were negative as

well. No significant findings was found in abdominal and chest radiograph.

Patient was subjected for computed tomography (CT) of the abdomen which showed findings suggestive of bowel injury (Figure 1). He was referred to the surgical team which proceeded with diagnostic laparoscopy converted to open. Intraoperative findings showed hemoperitoneum around 500 mls with ischemic small bowel of 30 cm in length with torn small bowel mesentery. Unhealthy small bowel was resected and primary anastomosis was performed. Post operatively, patient recovered well and was discharged after 5 days.

DISCUSSION

Traumatic small bowel perforation poses a diagnostic challenge for health care providers as they tend to have vague presentation. Various studies have attempted to find an effective algorithm to identify this injury however to no avail. One of the

challenges in constructing such an algorithm is the inadequate sample size to perform vigilantly consistent conclusion (Fakhry et al. 2019). Acute presentation is mostly from direct small bowel perforation, accounting for less than 1% off all cases (Fakhry 2019) while delayed presentations are mostly attributed as indirect cause of perforations or sealed perforations (Hamidian Jahromi et al. 2016). The basic pathogenesis for delayed presentation are likely mesenteric injury or sealed bowel perforations which both may lead to fibrosis or feeble initial irritation due to sealing effect of the prolapsed mucosa that might be missed (Hamidian Jahromi et al. 2016).

As cinical detection is difficult, the role of imaging plays an important role in diagnosing blunt abdominal trauma. The commonest tool used in the ED is the FAST scan, which is used for detection of free fluid in the abdomen post trauma to signify possibilities of intra-abdominal injury. However, the absence of free fluid is not definitive in ruling out intra-abdominal injury (Jansen et al. 2008). Multiple intra-abdominal injuries, especially small bowel perforations, will not have significant amount of free fluids intra-abdominally to be detected by the FAST scan. Studies have showed FAST scan have high false negative predictive value ranging from 42 to 94% (Kumar et al. 2015). A quick abdominal ultrasound may supplement the FAST scan, especially in cases suspected of small bowel injury. Abdominal ultrasound will reveal presence of free intraperitoneal air, resulting in an

increased echogenicity of a peritoneal stripe associated with multiple reflection artifacts and characteristic comet-tail appearance in the right upper quadrant between the anterior abdominal wall, in the prehepatic space. This sign is best visualised using a linear probe in the ultrasound. However, despite increasing fluency in ultrasound usage in the ED, the detection of positive signs are still operator dependent which may contribute to high percentage of false negative.

Computed tomography scan have an almost 100% sensitivity in detection of small bowel injury post blunt abdominal trauma (Hassan et al. 2012). Not only does the CT images show the extent of injury, it may also help in deciding the need of surgical intervention (Hassan et al. 2012). Computed tomography images have lesser interpersonal variability (Sherck et al. 1994) compared to ultrasound scan, thus less risk of operator dependent errors. Hence, it is the investigation of choice in cases of suspected bowel injury. However, it is vital to acknowledge that the gold standard for diagnosing small bowel perforation remains diagnostic laparoscopy. In cases with high index of suspicion and unavailability of CT scan, proceeding with diagnostic laparoscopy will help to reduce the unwanted morbidity secondary to delayed diagnosis. Delaying the diagnostic laparoscopy to get CT imaging are unwarranted as delays of more than 8 hours in detection of small bowel perforations increases mortality and morbidity significantly (Hamidian

Jahromi et al. 2016). However, in the absence of facilities with CT imaging, diagnostic peritoneal lavage (DPL) may be done which has a high accuracy with sensitivity of 95% and specificity of 99% (Jensen et al. 2008). On the negative side, DPL is an invasive procedure and has low sensitivity in detecting retroperitoneal injury.

In this depicted case, there were multiple pitfalls in the patient management. The presence of danger sign was not detected during the first presentations. Mechanism of injury and initial presentation of abdominal pain and bruises on the abdomen are highly suspicious of intra-abdominal injury. Patient should be considered for abdominal CT scan or at least surgical team referral for observation prior to discharge rather than relying on negative FAST scan alone. The case discussion also have focused on limitation of FAST scan and suggestion of additional imaging and observation for patient presented with blunt abdominal trauma (Engles et al. 2019). However, role of observation in the suspected blunt trauma is highly debatable. Multiple studies have shown beneficial outcome in early CT scan as it reduces the health economics cost in cases with delayed management and complications as well as reduces risk of hospital acquired infection. In this pandemic era, where prolonged hospital stay and overcrowding should be prevented; this should be used as a guideline.

However, it should be remembered that each case has to weigh the pros of CT scan against its cons as well as the risk of radiation and cost of the imaging.

To date, there is no guidelines to be followed in these cases which add on the challenges on how to approach a patient with a blunt trauma. This brings about the need of proper guidelines in imaging decisions in cases of blunt abdominal trauma to cover the grey areas in managing highly suspicious case. However, it is crucial to note that should the CT imaging be negative, the patient can safely be discharged. (Jensen et al. 2008). In the present case, if the decision to proceed with CT abdomen was made earlier, it might have prevented the progression of the injury from the initial trauma extending to the second visit. The other contentious issue is the accuracy of using FAST scan as screening tool in detecting intrabdominal injuries, including bowel injuries. Studies have shown the average fluid for initial detection by FAST scan is around 400 mls (Branney et al. 2008). In patient who are haemodynamically stable, risk of missing minimal free fluids in FAST scan are high. It further strengthened the need for proceeding with CT abdomen in highly suspicious cases, especially in haemodynamically stable patient in view of high index of negative FAST scan (Kumar et al. 2012)

CONCLUSION

Traumatic small bowel perforation poses a diagnosis challenge due to its vague and various presentations in the ED. Each case needs to be approached individually. Risk and benefits in monitoring versus investigating need to be weighed in managing patients with this injury. Threshold to proceed with

CT abdomen or diagnostic laparotomy need to be kept low in suspected cases. Being vigilant in cases of blunt abdominal trauma does reduces mortality and morbidity.

REFERENCES

- Branney, S.W., Wolfe, R.E., Moore, E.E., Albert, N.P., Heinig, M., Mestek, M., Eule, J. 1995. Quantitative sensitivity of ultrasound in detecting free intraperitoneal fluid. *J Trauma* **39**(2): 375-80
- Engles, S., Saini, N.S., Rathore, S. 2019. Emergency Focused assessment with sonography in blunt trauma abdomen. *Int J Appl Basic Med Res* **9**(4): 193-96.
- Fakhry, S.M., Allawi, A., Ferguson, P.L., Michetti, C.P., Newcomb, A.B., Liu, C., Brownstein, M.R., EAST small bowel perforation (SBP) Multi-Center Study Group. 2019. Blunt small bowel perforation (SBP): An Eastern Association for the Surgery of Trauma multicenter update 15 years later. *J Trauma Acute Care Surg* **86**(4): 642-50.
- Gad, M.A., Saber, A., Farrag, S., Shams, M.E., Ellabban, G.M. 2012. Incidence, patterns, and factors predicting mortality of abdominal injuries in trauma patients. *N Am J Med Sci* **4**(3): 129-34.
- Hamidian Jahromi, A., Johnson, L., Youssef, A.M. 2016. Delayed small bowel perforation following blunt abdominal trauma: A case report and review of the literature. *Asian J Surg* **39**(2): 109-12.
- Hassan, R., Abd Aziz, A., Mohamed, S.K. 2012. Computed Tomography (CT) of bowel and mesenteric injury in blunt abdominal trauma: a pictorial essay. *Med J Malaysia* **67**(4): 445-51.
- Jansen, J.O., Yule, S.R., Loudon, M.A. 2008. Investigation of blunt abdominal trauma. *BMJ* **336**(7650): 938-42.
- Kumar, S., Bansal, V.K., Muduly, D.K., Sharma, P., Misra, M.C., Chumber, S., Singh, S., Bhardwaj, D.N. 2015. Accuracy of focused assessment with sonography for trauma (FAST) in blunt trauma abdomen-a prospective study. *Indian J Surg* **77**(Suppl 2): 393-7.
- Sherck, J., Shatney, C., Sensaki, K., Selivanov, V. 1994. The accuracy of computed tomography in the diagnosis of blunt small-bowel perforation. *Am J Surg* **168**(6): 670-5.

Received: 03 Jul 2020

Accepted: 16 Oct 2020