Handlebar injury with evisceration and perforation of Roux-en-Y anastomosis in a liver transplanted 7-year-old

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Fascial disruption was then confirmed on CT scan of the abdomen and pelvis, with small bowel mesenteric fluid/hemorrhage suspicious for additional visceral injury (Fig. 1).

The decision was made to proceed to the operating room for exploratory laparotomy to exclude intra-abdominal injury, and to close the traumatic fascial defect. Discussion with the patient’s family in the interim revealed the patient had a history of biliary atresia, and had undergone Kasai procedure, followed by successful orthotopic liver transplant at 8 months of age. The patient had no other previous surgeries, no other medical history, and is an otherwise healthy and active 7-year-old.

An upper midline laparotomy incision was made, and after extensive lysis of adhesions, the small bowel was evaluated from the ligament of Treitz to the terminal ileum. The only injury identified was a nonexpanding 8 cm mesenteric hematoma at the junction of the biliopancreatic and Roux limbs created during the patient’s previous Kasai and liver transplant procedures. Upon closer inspection, this mesenteric hematoma was associated with a bowel perforation at the mesenteric border of the Roux-en-Y anastomosis (Fig. 2).

Given the lack of pediatric transplant surgery availability at the affiliate hospital, the decision was made to oversew the perforation, temporarily close the abdomen, and transfer the patient to our tertiary medical center for definitive repair of his injuries.

The patient remained intubated and hemodynamically stable throughout transfer to the pediatric intensive care unit (PICU) of our tertiary medical center. An operating room was prepared, and with the assistance of transplant surgery, the patient’s abdomen was re-explored.

The previously described injury was identified, and the anatomy confirmed. The Roux-en-Y anastomosis was approximately 30 cm distal to the ligament of Treitz, and there was adequate redundancy of the Roux limb. The injury to the bowel was a quarter-sized perforation that was leaking bilious enteric contents despite oversewing. Given the extent of devitalization, the decision was made to resect and revise the entire anastomosis. The three converging limbs of jejunum were each divided with a GIA stapler. A stapled side-to-side anastomosis was created between the biliopancreatic limb and the common channel. Then an end-to-side, two-layered,
A hand-sewn anastomosis was created between the Roux limb and the common channel of the distal jejunum, distal to the first anastomosis. After copious irrigation of the abdomen, the fascia was reapproximated, skin was loosely closed over a vessel-loop drain under the umbilical flap, and the patient was returned to the PICU. The remainder of the patient's hospital course was uneventful; he was discharged to home on post-operative day 9.

2. Discussion

Here we report a boy with a history of a liver transplant for biliary atresia, who suffered a handlebar impalement injury. The force transmitted was sufficient to disrupt the skin/soft tissues and fascia, resulting in traumatic evisceration of omentum, and to cause additional small bowel perforation and mesenteric hematoma at a particularly unfavorable location of his post-transplant reconstruction. To our knowledge, this is the first report in the literature of such an injury in a pediatric patient.

Bicycle handlebar injuries are common, and the vast majority follow a pattern of blunt abdominal trauma [1,2]. Reports in which injury patterns include fascial violation more consistent with penetrating trauma, are typically the result of direct end-on impact by brake handles or unprotected handlebars [3–5], with transmission of substantial kinetic force to a focal area of the abdominal wall and the underlying organs [1,5,6]. Resultantly, direct-impact handlebar injuries are associated with increased morbidity and higher rate of requiring operative intervention, compared to other bicycle-related injury mechanisms such as falls and flipping over the handlebars [6]. The combination of direct localized impact from the unprotected handlebar, and pre-existing abnormal bowel fixation related to postoperative adhesions, resulted in our patient’s injury pattern of evisceration and perforation of the underlying Roux anastomosis.

More than a technically challenging repair, this case represents a phenomenon we expect to become increasingly common. As pediatric surgical care continues to improve, pediatric patients’ functional status and return to normal activities are becoming increasingly commonplace. With this capacity to engage in normal childhood activities, and typical childhood risk-taking, comes an inherent risk of trauma. Given that a portion of these will require operative intervention, intimate knowledge of a patient's previous surgical procedures and the technical details associated with their altered anatomy, is imperative in appropriately repairing the injuries while preserving function. This speaks to the importance of all surgeons caring for trauma patients having a strong working knowledge of pediatric surgical procedures.

Conflicts of interest

None.

References