BRIEF COMMUNICATION

Inguinal Hernia in a Preterm Neonate Complicated by Strangulation and Subcutaneous Hernia Sac Rupture

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1. Introduction

Inguinal hernias are common among preterm neonates, with a relatively high rate of incarceration. We report a unique case of an extremely premature neonate with an enlarging right inguinal hernia that progressed to incarceration, bowel strangulation with necrosis, and subcutaneous rupture of the hernia sac on the 21st day of life requiring urgent laparotomy for reduction and resection of the necrotic small bowel and ostomy creation. The potential morbidity of a missed incarcerated inguinal hernia is high. Neonatologists and pediatricians should consider a low threshold for early surgical referral and evaluation in all pediatric patients. Although incarcerated inguinal hernias are relatively common in preterm neonates, we believe that this is the first report of an inguinal hernia with bowel strangulation and subcutaneous rupture of the hernia sac in a preterm neonate in the literature.

2. Case Report

A baby boy was born with a birth weight of 700 g at 25 3/7 weeks of gestation due to premature rupture of membranes at 20 weeks of gestation. The baby was intubated at birth, diagnosed with a Grade 1 intraventricular hemorrhage, and treated for *Staphylococcus aureus* bacteremia and pneumonia. The infant also required an oscillator for adequate oxygenation and ventilation. On the 18th day of life, the baby developed abdominal distension and feeding intolerance with a new right inguinal bulge. Over the following few days, the bulge became progressively larger and developed an overlying blue discoloration. The infant was transferred to our institution in this condition for surgical evaluation. Upon arrival in the neonatal intensive care unit, physical examination revealed a soft, mobile, tubular mass with overlying erythema in the right lower quadrant (Figure 1). A supine X-ray of the abdomen and chest demonstrated a soft tissue mass in the right lower quadrant with gas in the right hemiscrotum. An orogastric tube was placed. A brief attempt at bedside reduction of a suspected right inguinal hernia failed, thus prompting surgical exploration. At laparotomy, a transverse incision made over the right lower quadrant revealed necrotic bowel in the subcutaneous tissues without an overlying hernia sac. The bowel was traced back to the right external inguinal ring from which it was emanating. An attempt was made to reduce the bowel through the inguinal ring, but in vain. A transverse incision was made in the abdominal wall cephalad to the external inguinal ring revealing small bowel herniated through the internal and external inguinal rings. Additional attempts were made to reduce the small bowel into the abdomen through the inguinal canal without success. Because of the necrotic changes and the inability to reduce the bowel, the bowel was then divided proximally and distally to the area of necrosis. The remaining bowel...
could then be reduced into the abdomen. The hernia defect and external ring were closed. End-ileostomy and mucus fistula were created. The baby has undergone ostomy reversal and is now aged 7 months, without recurrence of the right inguinal hernia or the development of a contralateral hernia.

3. Discussion

Approximately 4% of the pediatric population is diagnosed with an inguinal hernia,1 with the majority of the cases occurring in boys.2 Inguinal hernias are common in premature infants, occurring in up to 30% of infants born with a weight of <1 kg. The risk of inguinal hernia incarceration in pediatric patients is high, between 5% and 15%, but it is even higher in premature infants, occurring in up to 39%.3 Observation complicated by incarceration can result in bowel ischemia and ovarian or testicular atrophy, necessitating emergency intervention with a greater risk of postoperative complications compared with elective repair.4 To our knowledge, this is the first report of a strangulated inguinal hernia with rupture of the hernia sac in a premature neonate, resulting in necrotic bowel in the subcutaneous tissues beneath the skin.

In contrast to the adult population where watchful waiting is a viable option for inguinal hernias, repair is the standard of care in the pediatric population due to the high rate of incarceration. A recent retrospective cohort study demonstrated that more than half of premature infants with an inguinal hernia experience incarceration.5 Further, very-low-birth-weight infants <1500 g have a threefold greater risk of requiring an emergency procedure than premature infants with higher birth weight. These infants who undergo emergency surgery predictably have a higher rate of major complications, including requiring bowel resection, recurrence of the hernia, or testicular atrophy, when compared with those undergoing elective repair (18.2% vs. 4.1%, p = 0.009).

The optimal timing of elective repair in the premature infant population is debated and varies between institutions. A study on 2030 neonates with inguinal hernia identified in the Pediatric Health Information System database demonstrated significant institutional variability in the timing of repair. Delayed repair, defined as repair occurring in an encounter subsequent to when the diagnosis was made, was performed in between 3% and 74% of neonates across 25 hospitals.2 Overall, 67.1% of patients underwent early inguinal hernia repair and 32.9% underwent delayed inguinal hernia repair. Patients undergoing delayed repair had a higher incarceration rate (9.4% vs. 2.3%). Patients undergoing early repair had a longer postoperative length of stay, required more critical care interventions, and had higher rates of readmission within 30 days and a higher rate of hernia reoperation at 1 year. These data were not stratified by birth weight category. Elective repair for these patients would never have been undertaken early enough in their life to have averted incarceration, given the patients’ acuity and size. However, earlier diagnosis may have prevented progression to strangulation and loss of bowel.

These data suggest that early repair of inguinal hernia during the initial diagnostic encounter in the premature population, particularly very-low-birth-weight premature infants, is prudent. Perhaps, had the child in the present case been referred earlier in his course, the incarceration may have been diagnosed and intervened upon earlier to prevent progression to strangulation and hernia sac rupture, thereby avoiding the morbidity of a bowel resection and ostomy. Early referral for surgical evaluation allows for risk stratification and optimal timing of repair.

Conflicts of interest

The authors have no conflicts of interest relevant to this article.

References