Annals of Pediatric Surgery

CASE REPORTS Open Access

Robot-assisted excision of urachal cyst: case report in a child

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Abstract

Background: The urachus is an embryological structure of the urogenital sinus and allantoid that connects the allantois to the early bladder in fetal life and then remains as the median umbilical ligament connecting the umbilicus to the dome of the bladder. An early laparoscopic procedure could trigger a quiescent urachal remnant to become symptomatic, causing a lesion or infection either during carbon oxide contamination or insufflation or a periumbilical or suprapubic port placement.

Case presentation: A 15-year-old girl complaining of supra-pubic abdominal pain. About 2 months previously, she had undergone laparoscopic appendectomy for acute appendicitis, and early postoperative period was uneventful. She underwent a robotic-assisted excision of a urachal cyst.

Conclusions: It has been suggested that early laparoscopic procedures could trigger previously asymptomatic urachal remnants to become symptomatic. Robot-assisted excision of a urachal cyst is a safe, effective alternative to open surgery in children.

Keywords: Urachal remnants, Urachal cyst, Robotics, Case report

Background

The urachus is an embryological structure of the urogenital sinus and allantoid that connects the allantois to the early bladder in fetal life and then remains as the median umbilical ligament connecting the umbilicus to the dome of the bladder [1–3]. Abnormalities in involution of the urachus may result in patent urachus, umbilical urachal sinus, vesico-urachal diverticulum, and urachal cyst [1]. In particular, a urachal cyst is reported to occur in 0.02% of live births but is symptomatic in just 0.00067% of the population [4]. An inadvertent rupture of a quiescent urachal remnant may, rarely, occur during a laparoscopic procedure, during port placement.

We report a case of a young girl that underwent a robotic-assisted excision of a symptomatic urachal cyst following laparoscopic appendectomy.

Case presentation

A 15-year-old girl was admitted to our Institution complaining of a supra-pubic abdominal pain. The symptoms lasted for 2 weeks. About 2 months previous, she had undergone a laparoscopic appendectomy for acute appendicitis, and the early postoperative period was uneventful. Moreover, preoperative Pediatric Appendicitis Score (PAS) was 7/10 and abdominal ultrasound had shown an appendix with a 7-mm diameter, with peri-appendiceal fluid.

The constant pain she complained of did not radiate and was 5/10 on the pain scale. There were no lower urinary tract symptoms. Urinalysis and blood tests were unremarkable, and C-reactive protein (CRP) was negative. An abdominal ultrasound and a magnetic resonance imaging (MRI) scan did not document any pathological abnormality, rather a supra-vesical cyst consistent with an enlarged urachal cyst (Fig. 1). For this reason, after informed consent was obtained, the patient underwent a robotic-assisted excision of the urachal cyst. Briefly, with

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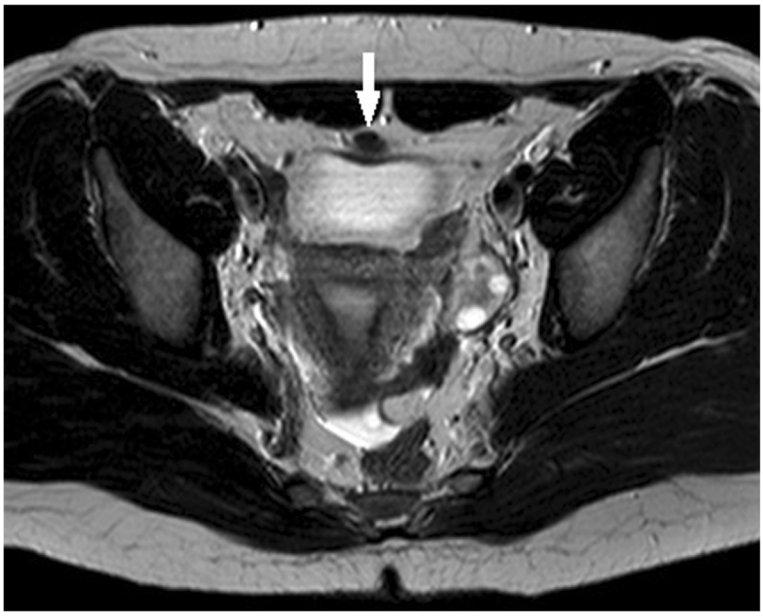

Fig. 1 A T2-weighted image on MRI showed a urachal cyst in front of anterior wall of bladder (arrow)

the patients in supine and Trendelenburg position, a 2-cm-long incision was performed above the navel, opening the fascia and accessing the abdominal cavity with trocar placement for optics. After induction of pneumoperitoneum at 12 mmHg, another 8-mm robotic trocar and two assistant ports, one 5 mm and one of 12 mm, were positioned according to the scheme for surgery in the lower pelvis. A lysis of some adhesions between the intestine and the abdominal wall was performed. The urachus was identified between the two umbilical ligaments and was followed cranially to its end where it was dissected. It was carefully separated from the bladder identifying a tiny passage (Fig. 2). The urachus was extracted using an endobag and sent for definitive histological examination. To ensure a tight suture, the bladder was sutured with V-lock 3-0 stitch (Fig. 3) and the parietal peritoneum was closed (Fig. 4). Postoperative course was uneventful, oral feeding was started the

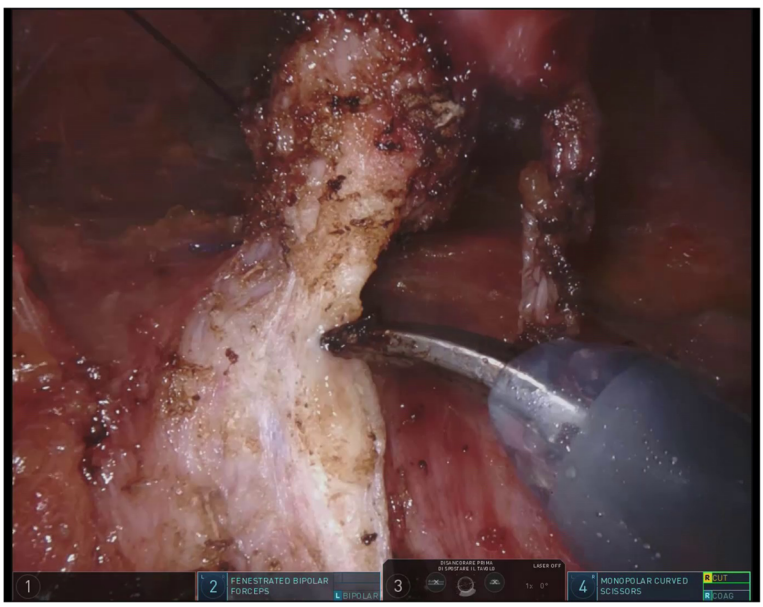

Fig. 2 The urachal cyst during robotic-assisted laparoscopic excision

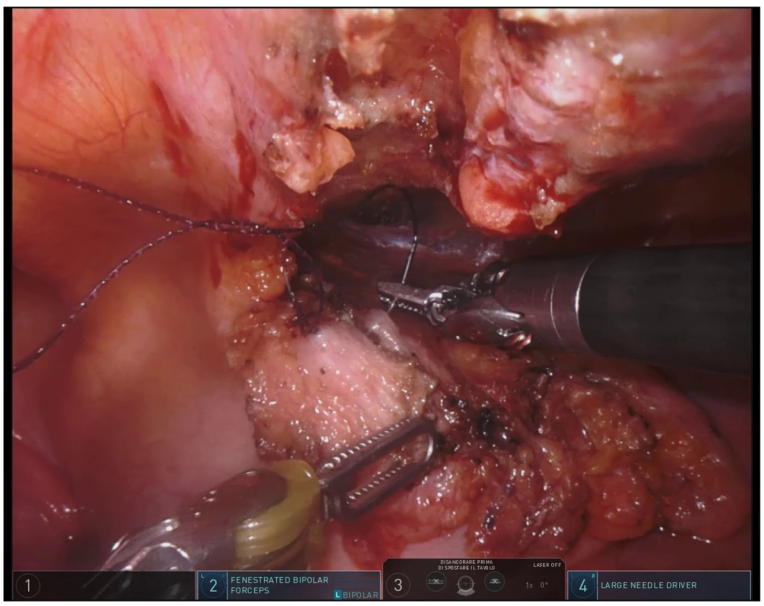

Fig. 3 Suture of bladder dome with V-lock stitch

day after the procedure, and the patient was discharged after 7 days. Histology confirmed a urachal cyst. Three months later, a follow-up ultrasound was normal.

Discussion

The sign and symptoms of urachal abnormalities range from a completely asymptomatic, incidentally found lesion to pain, infection, lower urinary tract symptoms, and rarely, malignant degeneration [1]. While the management of an asymptomatic urachal remnant is still controversial, surgical excision of a symptomatic lesion is strongly recommended. Even if open surgery has been deemed the mainstay for many years, minimal invasive techniques have been employed being considered a safe, effective alternative with additional advantages of improved anatomical visualization and cosmesis [5, 6]. Robotic-assisted laparoscopy for the surgical management in pediatric age of urachal anomalies was firstly

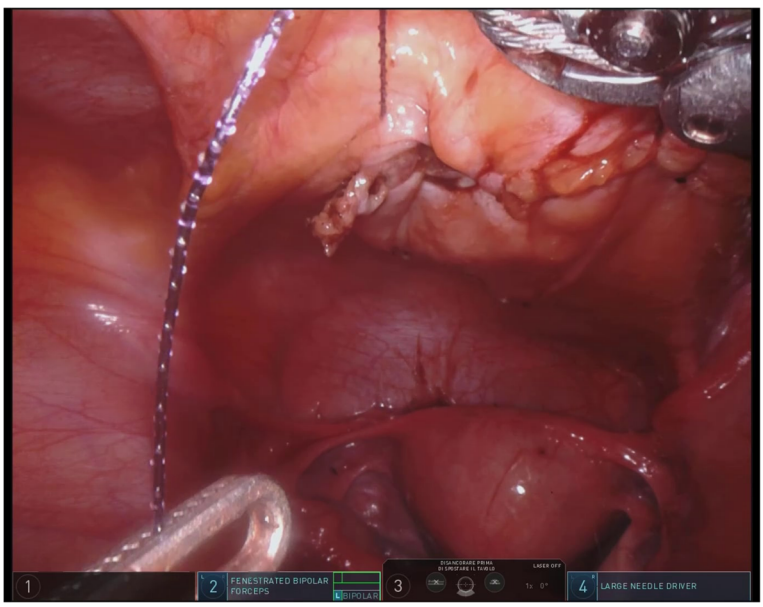

Fig. 4 Closure of anterior abdominal wall

described by Yamzon et al. [7]. Later, some case series of children who underwent robotic-assisted laparoscopic urachal cyst excision were reported [1, 8]. In front of longer operating times, including increased time for robotic setup, surgeon learning curve, and increased cost of robotic equipment, this technique offers the advantages of a 3-dimensional visualization, easier intracorporeal suturing and a more precise excision of the lesion compared to standard laparoscopy [9, 10]. In particular, in our case, the patient had undergone a previous laparoscopic appendectomy and robotic management was useful in carrying out a complete lysis of adherence.

Recently, it has been highlighted that early laparoscopic procedures could trigger previously asymptomatic urachal remnants causing them to become symptomatic. Port site injuries to urachal remnants have been reported in nine other cases, two involving urachal cysts [11, 12], two a possible patent urachus [11, 13], and five cases related to a urachal diverticulum [14–18]. Our case resembles a third reported case of a possible patent urachus probably injured during port placement.

A possible explanation could be that a lesion and contamination or insufflation of carbon oxide during placement of an umbilical or suprapubic port might have caused an enlargement of quiescent, asymptomatic urachal remnants [11]. Moreover, it is worth reflecting that even an emptied bladder, an iatrogenic lesion of an asymptomatic patent urachus or urachal diverticulum is susceptible to damage on insertion of a suprapubic port as the remnants are sited in the Retzius space [18].

In this regard, we carefully reviewed the video recorded during the laparoscopic appendectomy for signs of urachal remnant, and no urachal anomalies were visualized during the procedure. Moreover, an abdominal ultrasound was carried out before appendectomy not showing any urachal abnormality.

Conclusions

We believe that our case highlights at least two relevant concepts. Firstly, the placement of a periumbilical or suprapubic port during laparoscopic surgery could likely be the cause of latent asymptomatic urachal remnant lesion or infection. A symptomatic urachal remnant should be suspected if symptoms of abdominal pain occur after laparoscopic surgery. Moreover, this rare complication should be discussed with patients or parents before any laparoscopic procedure including an umbilical or suprapubic access. Secondly, in expert hands, robotic-assisted excision of a urachal cyst could be considered a safe, effective alternative to laparoscopy and open surgery also in pediatric patients, especially after previous abdominal surgery where postoperative adherence should be expected and managed.

Abbreviation

CRP: C-reactive protein

Acknowledgements

Not applicable

Authors' contributions

AS and IP conceived and designed the study. DFD and RM wrote the manuscript. FV and RC critically reviewed the manuscript. All authors read and approved the final manuscript.

Funding

Nothing to disclose

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Not applicable

Consent for publication

Written publication consent was obtained from the parent of this patient for publication of this case and accompanying images.

Competing interests

The authors declare no competing interests.

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Received: 6 November 2020 Accepted: 15 February 2021
Published online: 10 May 2021

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