

Pathology of the urachus in children

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Abstract

Introduction: Urachal malformations, arising from incomplete obliteration of the urachus during fetal development, are rare conditions predominantly seen in children. They present various clinical challenges due to their potential for infection and malignant transformation.

Objective: This study aims to report on the epidemiological, diagnostic, and therapeutic aspects of urachal malformations in a pediatric population.

Patients and methods: A retrospective study was conducted in the pediatric visceral surgery department of the Hassan II University Hospital of Fez over a period of 7 years (2014-2021), involving 10 cases of urachal pathology. Clinical presentations, radiological findings, treatment approaches, and outcomes were analyzed.

Results: The patients ages ranged from 1 to 15 years, with an equal gender distribution. The most common clinical presentation was umbilical discharge. Abdominal ultrasound was the primary diagnostic tool, supplemented by CT scans in six cases. Surgical treatment, typically involving midline sub-umbilical or peri-umbilical approaches, was performed in all cases, revealing 7 cysts, 2 fistulas, and 1 sinus. Postoperative outcomes were generally favorable, with an average hospital stay of 12 days. However, there was one recurrence and one wound infection. The mean follow-up period was 2.5 years.

Conclusion: Early diagnosis and appropriate surgical intervention are crucial for managing urachal malformations in children. Radiological imaging, particularly ultrasound, plays a vital role in diagnosis. While surgical excision of the urachus, including the bladder dome collar, is the preferred treatment to prevent recurrence and potential malignancy, careful follow-up is necessary to monitor for complications. Further studies are recommended to refine treatment protocols and improve patient outcomes.

Keywords: Urachal malformations; Umbilical discharge; Abdominal ultrasound; Surgical treatment; Bladder dome resection

1. Introduction

Malformations of the urachus result from a partial or complete failure of obliteration of the allantoic duct in the fifth month of gestation. Urachal abnormalities are rare (incidence 1/5000) and occur in children in 60% of cases, with a male predominance [1]. The circumstances of discovery vary. Diagnosis can be made antenatally, during ultrasound examination, or at birth, when urine discharge from the umbilicus or an umbilical mass is observed [2, 3]. Ultrasound

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may be sufficient for diagnosis. Surgical treatment is necessary because the major complication to be feared is malignant degeneration.

2. Material and methods

This is a retrospective analysis of 10 patients spanning 07 years from 2014 to 2021. The objective is to report the epidemiological, diagnostic, and therapeutic aspects of urachal malformations.

3. Results

The age of our patients ranged from 1 to 15 years, with an average age of 4.5 years and an equal gender distribution (5 boys and 5 girls). The most frequent reason for consultation was umbilical discharge, either serous or purulent, followed by swelling and pain in the umbilical area. Our reference examination was abdominal ultrasound, which showed a cystic formation with echogenic fluid content, establishing the diagnosis. CT scans were performed in 6 cases to characterize the lesion, revealing fistulized abscesses, urachal abscesses, or fistulized sinuses, the fistulography performed on a single patient showed a blind cavity, with a pathway connecting the urachus and the bladder [4].

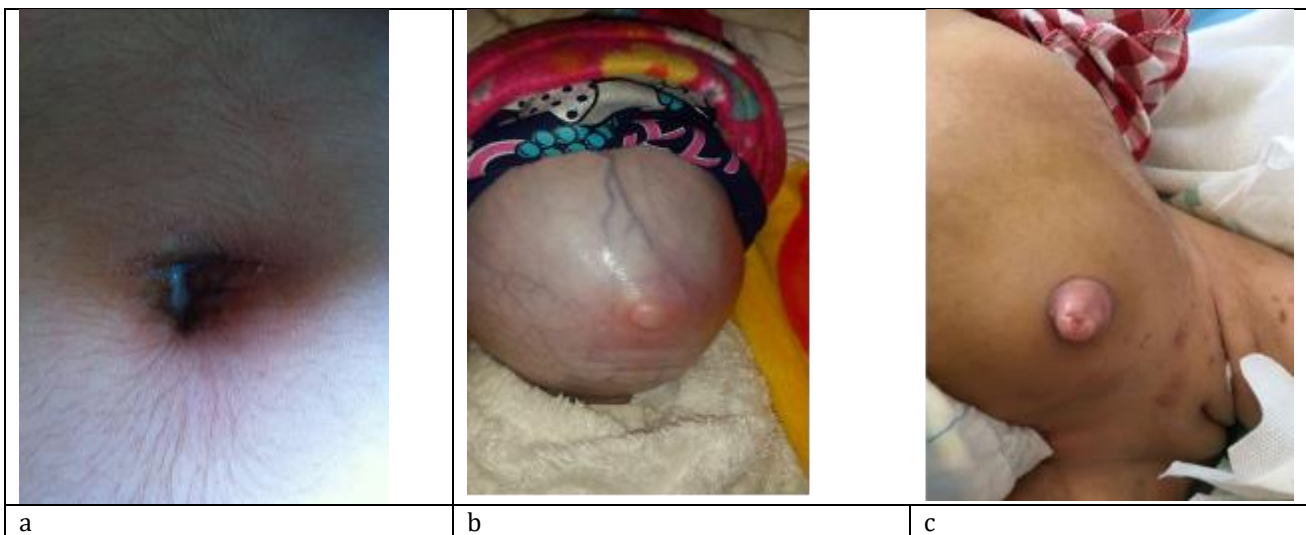


Figure 1 (a) clinical image of a patient with purulent umbilical discharge, (b) clinical image of a patient with abdominal distension and umbilical swelling, (c) clinical image of another patient with umbilical swelling resembling a hernia

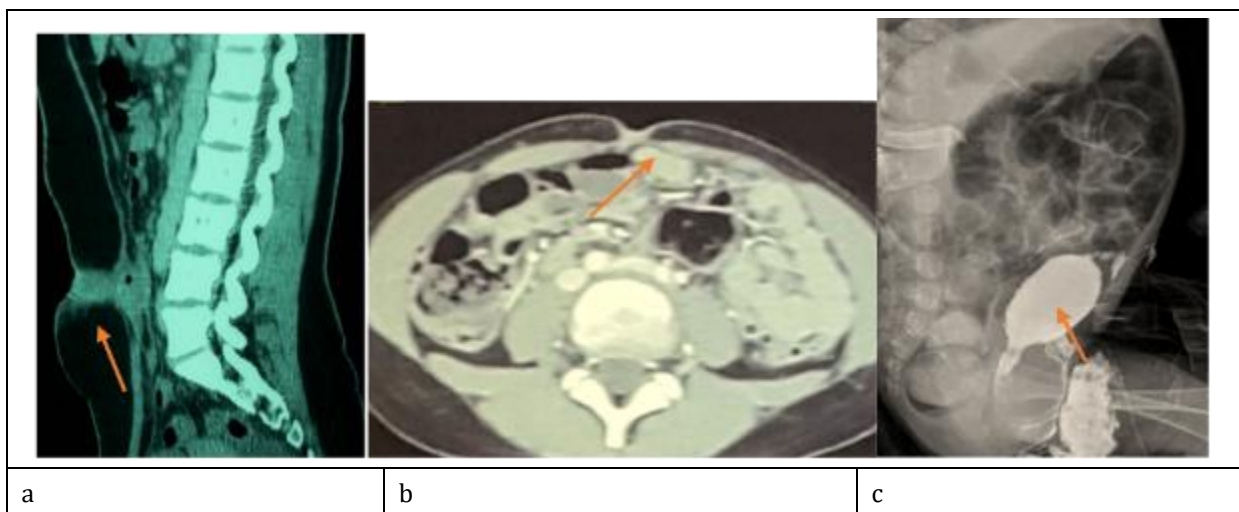


Figure 2 (a) (b) Abdomino-pelvic CT scan indicating a fistulized urachal abscess, (c) Contrast-enhanced fistulography through a urinary catheter showing the fistulous tract between the bladder and the urachus

All treatments were surgical in a single stage through a midline sub-umbilical or peri-umbilical approach. Surgical exploration revealed 7 cysts, 2 fistulas, and 1 sinus [4]. In infected forms, pus was drained, and urachal tissues were excised, including a bladder dome collar, followed by closure and Foley catheter placement. Postoperative antibiotic therapy with amoxicillin and clavulanic acid was administered. The average hospitalization duration was 12 days.

The pathological examination of the excised specimen did not reveal any malignancy.

One recurrence and one wound infection were noted, with favorable outcomes in other cases over an average follow-up of 2.5 years.

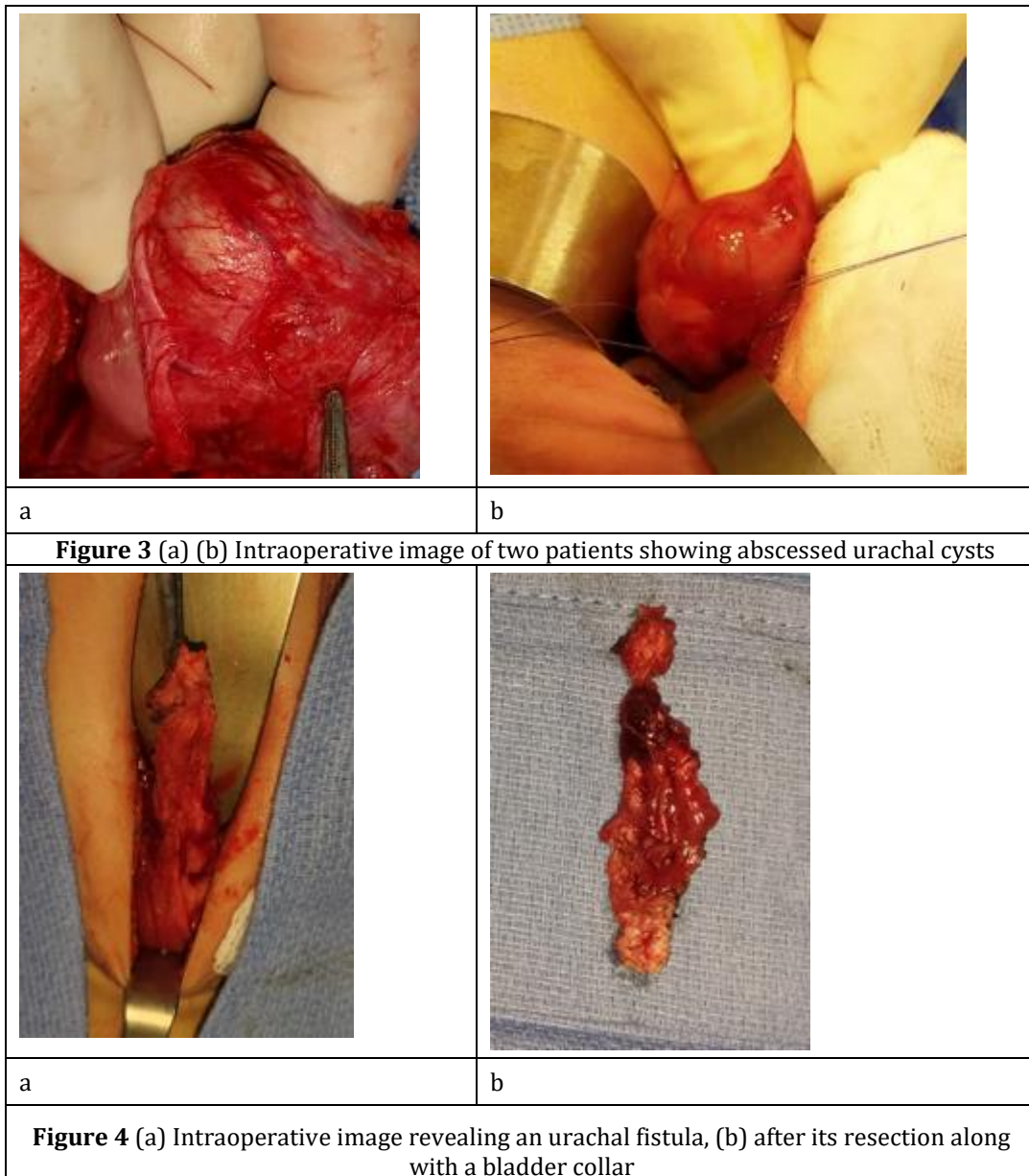




Figure 5 Clinical image depicting the occurrence of a recurrence marked by the reappearance of umbilical swelling

4. Discussion

In our study, umbilical fluid discharge was the main reason for consultation, followed by umbilical swelling, consistent with the literature. The frequency of anatomical forms of urachal pathology varies by author, with all agreeing that urachal diverticulum is the least common clinical form. Preoperative diagnosis of the anatomical form was confirmed by complementary examinations in only 4 patients, consistent with study by Yiee [5]. All our patients underwent a monobloc excision of the urachus including a bladder collar, whereas Cilento and Mesrobian [6, 7], Recommend limited excision for uncomplicated cysts and sinuses.

Table 1 Comparison of our study with the literature

Study	N	Umbilical Discharge	Cyst	Radio-Surgical Concordance	Bladder Dome Resection	Complications
Our study	10	70%	70%	40%	100%	2 cases (1 recurrence, 1 wound infection)
Cilento	45	52%	36%	30%	45%	6%
Yiee	31	54%	61%	37%	100%	86%
Mesrobian	21	57%	43%	51%	59%	0%

Laparoscopy is increasingly practiced due to shorter hospital stays, as shown by Okegawa et al., [1, 8].with 53 days vs. 103 days for laparotomy. Although some authors advocate abstention in the absence of complications [3], surgical treatment is necessary to prevent recurrence and malignant degeneration, estimated at 30% by Blichert [9]. In cases of urachal abscess, drainage with antibiotics followed by delayed surgical excision is recommended [10].

5. Conclusion

Based on this work, we make the following recommendations: consider urachal malformation in cases of umbilical discharge, induration, or sub-umbilical swelling. Request an ultrasound for any suspected urachal malformation, and systematically evaluate associated malformations, particularly looking for sub-vesical obstructions.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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