

## CASE REPORT

# Navel gazing

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### Abstract

*Introduction:* Umbilical disorders are a common reason for neonatal consultations in the emergency department. Although different conditions may present similarly, their management, complications, and prognosis can vary significantly.

*Case Report:* A 12-day-old neonate was referred to the Emergency Department due to a four-day history of serosanguineous umbilical discharge, along with one measurement of mild fever and a single episode of vomiting. Physical examination revealed an erythematous umbilicus without induration and a soft, non-reducible lump. As a complicated umbilical hernia was suspected, abdominal ultrasound was performed, which indicated the presence of an incarcerated umbilical hernia. The patient was admitted to the neonatal unit, where surgical intervention revealed a urachal diverticulum. The diverticulum was resected without complications, and the patient showed favorable clinical progress.

*Comment:* A thorough understanding of the differential diagnosis allows for an appropriate approach and treatment of our patients, avoiding delays in diagnosis and minimizing the risk of management errors.

### MIRARSE EL OMBLIGO

#### Resumen

*Introducción:* La patología umbilical supone uno de los motivos de consulta neonatal más frecuente en nuestras Urgencias. Aunque la presentación de las diferentes entidades puede ser parecida, su manejo, complicaciones y pronóstico pueden ser muy amplios.

*Caso clínico:* Neonata de 12 días de vida que es derivada al Servicio de Urgencias por secreción serohemática umbilical de 4 días de evolución junto con un pico febricular y un vómito aislado. En la exploración física destaca un ombigo eritematoso, indurado y doloroso a la palpación, con tumoración blanda, no reducible. Ante sospecha de hernia umbilical complicada se solicita ecografía abdominal, con imagen dudosa de hernia umbilical incarcerada. Se decide ingreso en Unidad Neonatal donde se realiza intervención quirúrgica, diagnosticándose finalmente un divertículo uracal. Se realiza resección del mismo, sin incidencias y con correcta evolución clínica.

*Comentario:* Un correcto conocimiento del diagnóstico diferencial permite realizar un correcto abordaje y tratamiento de nuestros pacientes, evitando retrasos en el diagnóstico y errores en el manejo.

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## INTRODUCTION

Neonates frequently present to pediatric emergency departments (PEDs) and the reasons for consultation are usually diverse. Retrospective studies from hospitals in Spain and Latin America estimate that neonates account for approximately 1.5% to 2% of all ED visits. Furthermore, conditions related to the umbilical cord are estimated to represent between 1% and 14% of consultations in this patient group<sup>(1-5)</sup>. This case report aims to review the differential diagnosis and management of different umbilical disorders.

## CASE REPORT

A 12-day-old neonate, born at term (41 weeks gestation) to a healthy mother in her second pregnancy, presented with no significant perinatal history. The mother had normal ultrasounds, negative serology except for immune rubella, a negative group B streptococcal vaginal culture, and experienced clear amniorrhexis for less than one hour. The infant's birth weight was appropriate for gestational age. Physical examination at birth showed no abnormal findings with a normal umbilical cord and unremarkable neonatal screening results. The infant was referred to the PED of a tertiary care hospital from her primary care center due to a 4-day history of umbilical serosanguineous discharge. The condition was initially diagnosed as a granuloma and had been managed with daily cleaning using chlorhexidine, as recommended by the pediatrician at the outpatient clinic.

The mother reported that the patient experienced a single episode of fever reaching 37.4°C, isolated vomiting after feeding the previous day, and irritability at night. She noted that the infant was generally well, with normal urination and bowel movements. She also reported that the umbilical area had previously healed well with dry dressing and the cord falling off at 7 days of life without any discharge or color changes. The infant had good weight gain with exclusive breastfeeding.

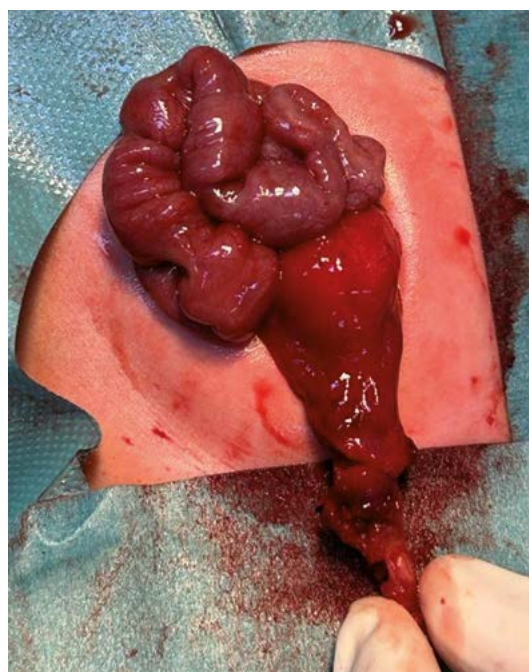
On physical examination, the patient had a stable pediatric assessment triangle and normal vital signs. The abdomen was soft, non-tender, and easily depressible upon palpation. The umbilicus was erythematous and indurated, without increased local temperature to the touch. There was serosanguineous discharge, which was not malodorous or purulent. Additionally, there was associated soft umbilical inflammation that was not reducible, and attempted reduction was painful (Figure 1).

Based on the clinical and examination findings, omphalitis was initially considered the primary diagnosis to exclude, due to the local inflammation, mild systemic symptoms, and risk for systemic involvement in neonates. However, in the presence of a wet umbilicus, differential diagnosis should also include malformations. In addition, a complicated umbilical hernia should be considered if there is a non-reducible mass. Given the appearance and progression of the umbilicus, the likelihood of a granuloma was considered low.

In view of these suspicions, a blood test was requested, which showed slightly elevated C-reactive protein levels (18.7 mg/L) and mild leukocytosis ( $23.50 \times 10^9/L$ ) with neutro-



**FIGURE 1.** Assessment of the umbilical area during physical examination of the patient. (Author: Dra. Mireia Sensarrich).



**FIGURE 2.** Urachal diverticulum identified during abdominal surgery. (Author: Dra. Núria Brun).

philia (62.6%), but below  $15.00 \times 10^9/L$ . Simultaneously, an abdominal ultrasound was performed, which suggested an incarcerated hernia after identifying a segment initially interpreted as thickened-walled intestine with a minimal amount of non-reducible fluid. Given the suspicion of a surgical abdomen and laboratory results without significant elevation of inflammatory markers, further infectious workup was considered unnecessary.

The patient was admitted to the neonatal unit, where a prophylactic dose of pre-surgical antibiotic therapy with amoxicillin-clavulanic acid (50/10 mg/kg) was administered. Surgery was performed under general anesthesia, revealing a diverticular structure connected to the bladder dome, leading to a diagnosis of a urachal diverticulum (Figure 2). The histopathological examination confirmed

TABLE 1. Differential diagnosis of umbilical disorders<sup>6-10</sup>.

	Incidence	Etiology	Presentation	Treatment
Granuloma	Most common umbilical mass <sup>8</sup>	Scar tissue overgrowth	<ul style="list-style-type: none"> <li>• Small, pink, moist, “velvety” nodule.</li> <li>• 3-10 mm</li> <li>• Serosanguineous discharge</li> <li>• Seen after cord separation</li> </ul>	75% silver nitrate cauterization Non-iodized common salt
Omphalitis	0.7-6%	Polymicrobial infection: <i>S. aureus</i> <sup>9</sup> > group A and B Streptococci, gram-negative bacilli > anaerobic bacteria	<ul style="list-style-type: none"> <li>• Painful erythematous induration in the periumbilical region</li> <li>• Purulent and malodorous discharge</li> <li>• Systemic symptoms: fever, lethargy, decreased feeding</li> </ul>	Admission + antibiotic therapy (gram-positive cocci and gram-negative bacilli)
Umbilical hernia	Most common umbilical pathology 10% <sup>8</sup>	Umbilical ring malformation	<ul style="list-style-type: none"> <li>• Soft umbilical swelling</li> <li>• Different sizes</li> <li>• No associated discharge</li> <li>• Asymptomatic. If symptomatic, suspect incarceration or strangulation</li> </ul>	Watchful waiting in asymptomatic cases Surgery in case of complications
Urachal persistence	Urachal fistula	Failure of complete obliteration	Discharge of urine at umbilicus	Surgery
	Urachal cyst	Middle portion of urachus fails to obliterate	Periumbilical mass in childhood	
	Urachal sinus	Failure of obliteration of the distal portion	Periumbilical discharge	
	Urachal diverticulum	Failure of obliteration of the proximal portion	Usually asymptomatic	
Persistence of the omphalomesenteric duct	Mucosal polyp	Ectopic gastric or pancreatic mucosa	Umbilical raspberry-red mucosal tumor	Surgery
	Vitelline band	Remnant fibrous band of the duct	Complication causing intestinal volvulus, strangulation or intestinal obstruction	
	Umbilical fistula	Complete failure of duct obliteration	Umbilical fecal or biliary secretion	
	Meckel's diverticulum	Protrusion of the ileum due to failure of obliteration of the proximal portion	<ul style="list-style-type: none"> <li>• Abdominal pain</li> <li>• Digestive bleeding</li> <li>• Intestinal obstruction</li> <li>• Diverticulitis</li> </ul>	
	Vitelline cyst	Failure of obliteration of the middle portion	Periumbilical mass	

the presence of a fistulous tract and ruled out malignancy, consistent with the surgical diagnosis. The patient was admitted for close observation and remained afebrile, with no new systemic symptoms and a gradual decrease in acute-phase reactants, so further infectious workup was not conducted. Nevertheless, if fever or other laboratory abnormalities had developed, screening for a urinary tract infection and cultures, such as blood culture and culture of the lesion, would have been indicated, followed by appropriate antibiotic therapy as needed. The patient's condition evolved favorably, and she was discharged home 4 days after surgery.

## DISCUSSION

Accurate differential diagnosis of umbilical disorders is essential, as different conditions have varying implications for management and prognosis. To correctly understand these

conditions and their potential diagnoses, it is important to understand the anatomy of the umbilical region.

The umbilical cord is a vital transitional structure in intrauterine maternal-fetal communication, but its function ends after delivery.

During intrauterine life, the umbilical cord is composed of two umbilical arteries, one umbilical vein, the allantois, the omphalomesenteric duct, and intestinal loops, all of which are surrounded by Wharton's jelly and the amnion<sup>(6,7)</sup>. Incorrect involution of any of these structures will lead to abnormal communications in extrauterine life, while incorrect formation of the umbilical ring will lead to possible umbilical hernias. Beyond structural alterations, infections should also be taken into account.

This case involves differentiation between an infectious process (omphalitis), hernia, and malformation (primarily urachal persistence). Accurate diagnostic assessment is based on the recognition of the distinct symptoms and features of each condition (Table 1).

Once the differential diagnosis has been established, in case of diagnostic doubts or alarm signs (purulent suppuration, fever, irritability, etc.), complementary tests will guide the final diagnosis<sup>(12)</sup>:

- Laboratory tests (evaluation of acute-phase reactants, leukocyte count, and blood culture): when an infection is suspected.
- Contrast-enhanced abdominal X-ray: when umbilical hernias or persistent omphalomesenteric duct are suspected.
- Ultrasonography: in the differential diagnosis of abdominal masses.
- Cystography: when a urachal fistula is suspected.

### COMMENTARY

This case report highlights the importance of accurate differential diagnosis of umbilical disorders in the PED. Understanding the variations in management, complications, and prognosis for different conditions is essential. To facilitate this process, we can rely on different complementary tests, of which blood analysis and abdominal ultrasound are the most appropriate and accessible to guide the diagnosis.

It is necessary to emphasize the value of health education for families in maternity wards, a tool to prevent complications and to focus on warning signs.

### STATEMENT OF THE AUTHORS

The authors declare no conflicts of interest. Informed consent has been obtained from the family for the publication of this case.

### REFERENCES

1. Fernández Ruiz C, Trenchs Sainz de la Maza V, Curcoy Barcenilla AI, Lasuen del Olmo N, Luaces Cubells C. Asistencia a neonatos en el servicio de urgencias de UN hospital pediátrico terciario. *An Pediatr.* 2006; 65(2): 123–8. doi: 10.1157/13091480.
2. Hepepe Montero M, Martínez Sánchez E, Olivas Monteagudo F, Quesada JA, Aleixandre Blanquer F. ¿Por qué acuden los neonatos al servicio de urgencias?. *Actual Med.* 2021; 106(813): 165–76. doi: 10.15568/am.2021.813.or03.
3. Lara B, Aguilera P, Garrido M, Hirsch T, Swadron S, Saldías F. Consultas ambulatorias pediátricas atendidas en el Servicio de Urgencia de un hospital universitario. *Rev Chil Pediatr.* 2014; 85(2): 174–82. doi: 10.4067/S0370-41062014000200006.
4. Cabrera Mendoza S, Iglesias Leboireiro J, Bernárdez Zapata I, Marín Romero M, Hidalgo Vázquez MM, Braverman Bronstein A. Principales causas de visita de neonatos al servicio de urgencias de un hospital privado. *An Med Asoc Med Hosp ABC.* 2016; 61(4): 251–5. doi: 10.15568/am.2021.813.or03.
5. Mas M, Casuriaga A, Giachetto G, Giacoia C, Centena L, López M, et al. Características de las consultas de los recién nacidos en un servicio de emergencia pediátrica. *Rev Med Urug.* 2021; 37(4): e37408. doi: 10.29193/RMU.37.4.7.
6. Sánchez-Castellanos ME, Sandoval-Tress C, Hernández-Torres M. Persistencia del Conducto Onfalomesentérico. Diagnóstico diferencial de granuloma umbilical en la infancia. *Actas Dermo-Sifiliogr.* 2006; 97(6): 404–5.
7. Das A. Umbilical lesions: A cluster of known unknowns and unknown unknowns. *Cureus.* 2019; 11(8): e5309. doi: 10.7759/cureus.5309.
8. Araneda Piña L, Astudillo Manosalva C, Rostion Allel C. Patología del ombligo. *Rev Ped Elec.* 2015; 12(1): 28–39.
9. Meltzer DI. A Newborn with an umbilical mass. *Am Fam Physician.* 2005; 71(8): 1590–2.
10. Bernal Torres A, Cárdenas Cárdenas JF, Moreno García A, Viejo Almanzo A. Infección de remanente uracal como causa infrecuente de dolor abdominal. *RAPD.* 2022; 45(5): 181–5.
11. Common umbilical disorders - Emergency management in infants. Guideline - Children's Health Queensland Hospital and Health Service; 2021 [Updated April 30, 2023]. Available at: <https://www.childrens.health.qld.gov.au/wp-content/uploads/PDF/guidelines/gdl-00770.pdf>
12. Minkes RK. Disorders of the umbilicus. *Practice Essentials, Anatomy, Pathophysiology.* Medscape; 2023 [Updated April 30, 2023]. Available at: <https://emedicine.medscape.com/article/935618-overview>