Umbilical Granuloma with Coexisting Patent Urachus Complicated by Inadvertent Copper Sulphate Application: A Case Report

Dr. Anusha Chauhan[1], Dr. Roshan sadashiv thakare[2], Dr. Abhishek dadhich[3], Dr. Mahendra Kumar Sharma[4]
[1,2] *M.D. Scholar, P.G. Department of Rachna Sharir, DSRRAU, Jodhpur*
[3] *Assistant Professor, P.G. Department of Rachna Sharir, DSRRAU, Jodhpur*
[4] *Associate Professor, HOD, P.G. Department of Rachna Sharir, DSRRAU, Jodhpur*
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***Abstract*—Umbilical granuloma is a common benign condition in neonates and infants, usually managed with conservative measures such as topical silver nitrate or ligation. Patent urachus, a rare congenital anomaly resulting from failure of urachal obliteration, may present with persistent umbilical discharge and can clinically mimic or coexist with umbilical granuloma. Misdiagnosis or incomplete evaluation may lead to inappropriate treatment and complications. We report a case of an infant with umbilical granuloma associated with a 0.8 cm patent urachus, in whom copper sulphate was inadvertently applied, resulting in local tissue injury. This case highlights the importance of thorough evaluation of persistent umbilical discharge, awareness of urachal anomalies, and avoidance of caustic agents without definitive diagnosis.**

***Index Terms*—Umbilical granuloma, Patent urachus, Umbilical discharge, Copper sulphate injury, Congenital anomalies**

I. INTRODUCTION

The umbilicus is a frequent site of pathology in neonates and infants due to its unique embryological origin and postnatal changes. Umbilical granuloma is among the most common umbilical conditions encountered in pediatric practice, typically presenting as a small, moist, reddish mass with serous discharge after separation of the umbilical cord. It is generally benign and responds well to conservative treatment such as topical silver nitrate cauterization or common salt application.

In contrast, urachal anomalies are rare congenital conditions resulting from incomplete obliteration of the urachus, an embryonic tubular structure connecting the fetal bladder to the allantois. Patent urachus represents the most severe form, characterized by a persistent communication between the bladder and umbilicus, often presenting with clear or urine-like discharge from the umbilicus. The reported incidence of urachal anomalies is approximately 1 in 5000 births, with patent urachus being even less common.

Clinical overlap between umbilical granuloma and urachal anomalies can lead to diagnostic confusion. Inappropriate treatment of an underlying urachal anomaly as a simple granuloma may result in complications, delayed diagnosis, or tissue injury, especially when caustic substances are used. Copper sulphate, though historically used as a cauterizing agent, is no longer recommended due to its potential for chemical burns and systemic toxicity.

This case report describes an infant with umbilical granuloma coexisting with a small (0.8 cm) patent urachus, complicated by inadvertent copper sulphate application. The case underscores the importance of careful assessment of umbilical lesions and judicious selection of treatment modalities.

II. METHODS (CASE DESCRIPTION)

This case report was prepared based on detailed clinical evaluation, imaging findings, management course, and follow-up of a single patient presenting with persistent umbilical discharge. Informed consent was obtained from the parents for anonymized publication of clinical details and images. Patient confidentiality has been strictly maintained. Clinical

examination findings, ultrasonography reports, and treatment outcomes were documented prospectively and analyzed descriptively.

III. RESULTS

- Patient Information

An infant, born one month preterm by lower-segment cesarean section (LSCS), was brought to the outpatient pediatric/surgical clinic . complaint of a small reddish mass at the umbilicus since umbilical cord separation. There was no history of fever, abdominal distension, or urinary symptoms reported initially.

On local examination, a small, moist, reddish granulation tissue was observed at the umbilicus, suggestive of umbilical granuloma. The surrounding skin appeared mildly inflamed with intermittent serous discharge.

The discharge was described as serous to occasionally clear, with intermittent wetness of the umbilical area.

- Clinical Findings

On physical examination, the infant was active, afebrile, and hemodynamically stable. Local examination of the umbilicus revealed a small, reddish, moist, friable tissue protruding from the umbilical base, consistent with an umbilical granuloma. Mild surrounding erythema was noted, but there were no signs of acute infection such as purulent discharge, warmth, or tenderness. Gentle pressure around the umbilicus occasionally increased the discharge.

(a)initial condition of the patient

Based on the initial clinical impression of umbilical granuloma, ligation of the granuloma was performed as an initial therapeutic measure. However, copper sulphate was inadvertently used instead of the recommended silver nitrate or conservative measures as part of initial management. And mistakenly, it remained applied for 7-8 hrs and it caused bleeding over there.

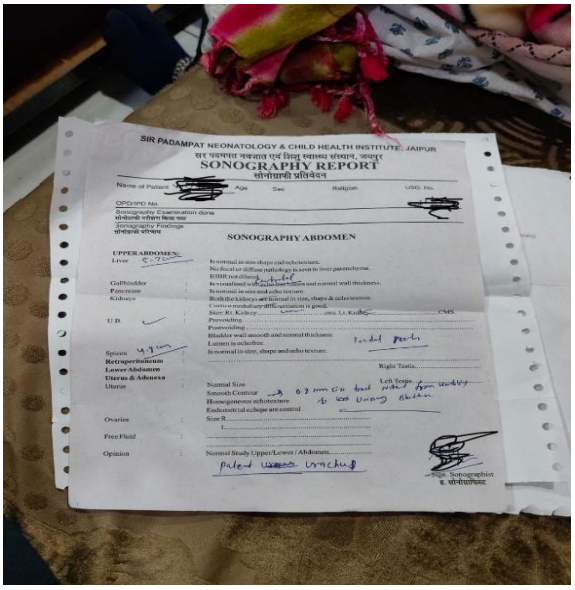
- Complication Following Copper Sulphate Application

Within a short period after application, the umbilical area showed signs of local tissue irritation and chemical injury. The parents reported increased redness and discomfort at the site. On re-examination, superficial chemical burn-like changes were observed around the granuloma, prompting immediate cessation of the agent. The area was thoroughly irrigated with normal saline, and local wound care was initiated.

(b)condition after applying copper sulphate as chemical cautery

- *Diagnostic Assessment*

Given the persistent nature of the discharge and the atypical response to treatment, further evaluation was undertaken. Ultrasonography of the abdomen and pelvis revealed a tubular tract extending from the umbilicus toward the dome of the urinary bladder, measuring approximately 0.8 cm in diameter, consistent with a patent urachus. The bladder appeared otherwise normal, and no associated renal anomalies were detected.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सर पद्मपत नवजात एवं शिशु स्वास्थ्य संस्थान, जयपुर
SONOGRAPHY REPORT
सोनोग्राफी प्रतिवेदन
Name of Patient Age Sex Religion USG. No.
OPD/IPD No.
Sonography Examination done
Sonography Findings
SONOGRAPHY ABDOMEN
UPPER ABDOMEN:
Liver
Gallbladder
Pancreas
Kidneys
U.D.
Spleen
Retroperitoneum
Lower Abdomen
Uterus & Adnexa
Uterus
Ovaries
Free Fluid
Opinion
Normal Study Upper/Lower/Abdomen.
Patent Urachus
Sign. Sonographist
हस्ता. सोनोग्राफिस्ट

(c)usg report of the patient

Routine laboratory investigations, including complete blood count and inflammatory markers, were within normal limits. Clinical photographs of the umbilical lesion before and after intervention, as well as relevant imaging findings, were documented for academic and publication purposes. Urine examination did not show evidence of infection.

- Therapeutic Intervention

After diagnosis, conservative management of the chemical injury was continued with gentle cleansing, topical antibiotic ointment, and protective dressing. Once local inflammation subsided, the patient was referred to pediatric surgery for definitive management of the patent urachus.

The child was monitored closely, and no further complications were noted. And ligation was done on umbilical granuloma and it remained ligated for around 1 month . after that it is seen, it gets shedded and after 1 month ultrasound again was performed and it was seen that patent urachus was also closed.

- Follow-Up and Outcomes

On follow-up visits, the umbilical wound showed good healing with resolution of erythema and discharge. The infant remained asymptomatic systemically. Management was undertaken successfully (or planned, depending on institutional protocol), and no recurrence of discharge was noted during subsequent follow-up. The child continued to thrive with normal growth and development.

(d) condtion after ligation after one month

IV. DISCUSSION

Umbilical granuloma is a common diagnosis in infancy; however, persistent umbilical discharge should always raise suspicion of underlying anomalies such as urachal remnants or omphalomesenteric duct anomalies. Patent urachus, though rare, presents classically with continuous or intermittent clear discharge from the umbilicus, which may be mistaken for serous discharge from a granuloma.

In the present case, coexistence of an umbilical granuloma with a small patent urachus led to diagnostic ambiguity. The inadvertent application of copper sulphate resulted in local chemical injury, highlighting the potential risks of using caustic agents without definitive diagnosis. Copper sulphate has largely fallen out of favor due to reports of tissue necrosis, systemic absorption, and toxicity, especially in neonates and infants.

Ultrasonography serves as a simple, noninvasive, and effective diagnostic tool for evaluating persistent umbilical discharge. Early imaging could have identified the urachal anomaly and prevented inappropriate treatment. Current literature supports surgical excision of patent urachus due to risks of infection, stone formation, and, rarely, malignant transformation later in life.

This case emphasizes several important learning points: the need for careful evaluation of umbilical lesions, avoidance of outdated or harmful treatments, and the importance of imaging in atypical or non-resolving cases. Increased awareness among clinicians can prevent complications and improve outcomes.

V. CONCLUSION

This case report highlights a rare but clinically significant association of umbilical granuloma with

patent urachus, complicated by inadvertent copper sulphate application. Persistent umbilical discharge should prompt thorough evaluation to rule out underlying congenital anomalies before initiating treatment. Safe, evidence-based management and early use of imaging can prevent iatrogenic complications. Reporting such cases contributes to improved clinical vigilance and patient safety in pediatric practice.

CLINICAL MESSAGE / LEARNING POINTS

- Not all umbilical granulomas are isolated superficial lesions
- Patent urachus should be ruled out in persistent umbilical discharge
- Chemical cauterization without imaging can lead to complications
- Ultrasonography should be considered before applying cauterizing agents