Case Report

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Is Subcutaneous Seeding Possible Following PAIR Treatment of a Hydatid Cyst? A Case Report and Current Literature Review

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Abstract

Cystic echinococcosis (CE) is a widespread endemic helminthic disease caused by infection with the metacestodes of *Echinococcus granulosus*. This article reports the case of a 30-year-old woman who presented with a cystic lesion in the lumbar region. On the physical examination, cystic structures were palpated in the left gluteus maximus and posterior to the paravertebral muscles. Following a puncture, aspiration, injection, reaspiration (PAIR) procedure, an magnetic resonance imaging revealed a hyperintense cyst consistent with a newly developed CE1 hydatid cyst, likely resulting from subcutaneous seeding during the intervention. Various treatment modalities for hydatid disease have been described in the literature, including medical therapy, surgical approaches (laparoscopic, open, and robotic), and percutaneous techniques. In the majority of the articles, it has been indicated that PAIR treatment is associated with several risks and therefore should be recommended only for selected patients. This case demonstrates the effectiveness of PAIR therapy in reducing the number of daughter vesicles within hydatid cysts but also emphasizes the need for close follow-up due to the potential risk of new cyst formation caused by seeding during the procedure, particularly in atypical sites such as subcutaneous tissue. To the best of our knowledge, this is the first case described in the literature with this presentation.

Keywords: Echinococcus granulosus, subcutaneous tissue, physical examination, cysts, lumbosacral region

Introduction

Cystic Echinococcosis (CE) is a parasitic disease caused by *Echinococcus granulosus* and remains a major public health problem in endemic regions (1-3). Diagnosis is established through a combination of clinical examination, serological tests, imaging, and patient history (1,2). Currently, various treatment options are available, including medical therapy, surgery (laparoscopic, open, or robotic), and percutaneous approaches (1,4). Among these, the puncture, aspiration, injection, reaspiration (PAIR) technique is a percutaneous method used in the management of hydatid cysts and is primarily recommended for World Health Organization (WHO) type CE1 and CE3a cysts smaller than 10 cm in diameter (3).

This article reports the case of a 30-year-old woman who presented to the hospital with a cystic lesion in the lumbar region. Following PAIR treatment, the patient developed a newly formed subcutaneous cyst on the dorsal

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side, possibly due to seeding during the procedure. To the best of our knowledge, this is the first case described in the literature with such a presentation. Current literature lacks sufficient data regarding the seeding potential of PAIR therapy.

Case Report

Our case involves a 30-year-old female refugee patient who presented to the hospital in 2021 with a cystic lesion in the lumbar region. All necessary informed consent was obtained from the patient prior to the procedures. Her ultrasonography revealed a 12 cm cystic lesion with septal components. A lumbar magnetic resonance imaging (MRI) was subsequently performed, which demonstrated a CE3b hydatid cyst located paravertebrally in a T2-weighted sagittal section (Figure 1). In addition, a 7 cm renal hydatid cyst was identified. On physical examination, cystic structures were palpable posterior to the paravertebral muscles and within the left gluteus maximus.

After undergoing abscess drainage at another public hospital, the patient subsequently presented to our hospital. Her prior medical history was reviewed, and follow-up MRI scans were requested. Post-drainage imaging revealed a CE3b hydatid cyst located paravertebrally, with a markedly reduced number of hyperintense daughter vesicles in the T2-weighted sagittal MR scan. Additionally, an increase in heterogeneous hypointense fragments (germinative membranes, dead scolices, etc.) was noted on T2A images compared to pre-treatment (Figure 2). In T2-weighted axial section MRI, dead scolices and remnants of the germinative membrane appeared hypointense within the paravertebral hydatid cyst (Figure 3). Cardiac MRI further demonstrated a 3 cm lesion, presumed to be a hydatid cyst, located on the right ventricular side of the septum. Left ventricular systolic function was normal. The patient received albendazole therapy with a dosage of two doses of 400 mg.

Following albendazole treatment, the patient was referred to the interventional radiology department for PAIR therapy. During the subsequent physical examination, newly developed cystic structures were palpable posterior to the paravertebral muscles. Post-therapeutic control computed tomography (CT) scans demonstrated a hyperintense cyst, located within the muscle plane beneath the skin (Figure 4), consistent with a newly formed CE1 hydatid cyst, likely resulting from seeding into the subcutaneous tissue during PAIR therapy.

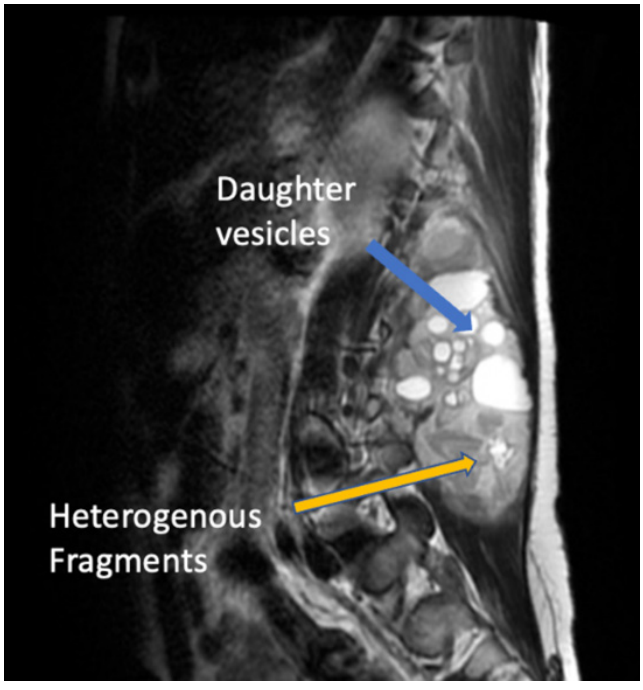

Figure 1. The CE3b hydatid cyst, which is situated in the paravertebral region on T2-weighted sagittal section MRI, contains daughter vesicles that are clearly hyperintense on T2A and contain heterogeneous hypointense fragments in the lower part of the cyst
CE: Cystic echinococcosis, MRI: Magnetic resonance imaging

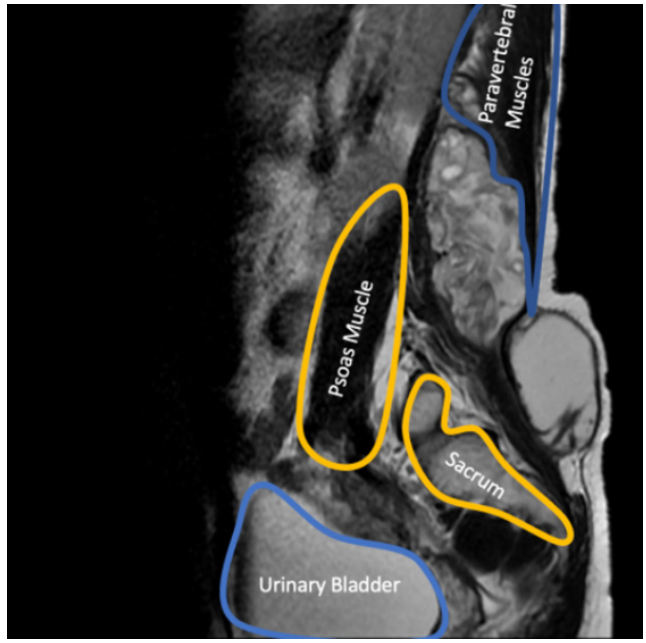

Figure 2. The T2-weighted sagittal section MRI demonstrates a CE3b hydatid cyst located paravertebrally. The cyst contains fewer daughter vesicles, which are visibly hyperintense on T2A, and an increase in heterogeneous hypointense fragments on T2A (germinative membranes, dead scolices, etc.) compared to before treatment
CE: Cystic echinococcosis, MRI: Magnetic resonance imaging

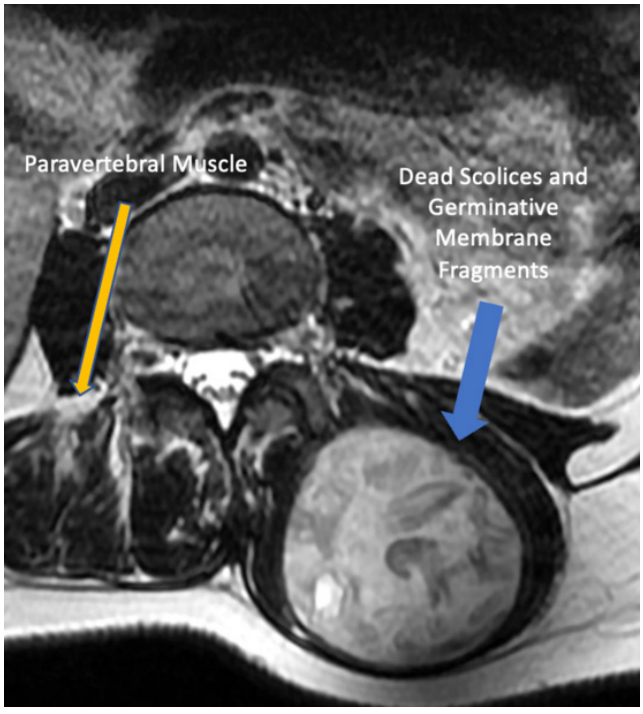

Figure 3. On T2-weighted axial section MRI, dead scolexes and germinative membrane fragments are observed as hypointense in the paravertebral muscle hydatid cyst

MRI: Magnetic resonance imaging

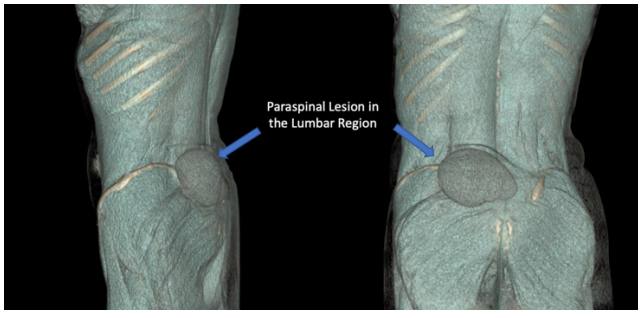

Figure 4. The 3D image produced by abdomen CT reveals a paraspinal lesion resulting in swelling of the skin in the lumbar region, achieved by volume rendering techniques

3D: Three-dimensional, CT: Computed tomography

Control imaging revealed hydatid cysts in the liver, left kidney, paravertebral muscles at the L4-L5 and S1 levels, and in the gluteus maximus muscle, all identified on the abdominal CT scan. The patient also underwent the modified catheterization technique (MoCaT) procedure, and a cytological analysis was conducted, confirming the diagnosis of a hydatid cyst. After this treatment, however, the patient did not continue with the planned management, and therefore her current status remains unknown.

Discussion

Cystic Echinococcosis is a helminthic disease that is widely endemic and is primarily caused by infection with Echinococcus granulosus (1,2,5-7). In 70% of cases, the liver is the primary site of involvement, though the lungs and other organs can also be affected (1,4,5,8-10). Case reports in the literature rarely document muscle involvement in hydatid cysts. It is considered unusual due to lactic acid levels and muscle contractions (7).

There is no single optimal medical treatment for hydatid cysts, as noted by Bhalla et al. (1) however, albendazole has shown therapeutic potential. In selected patients for whom surgery is not feasible, the PAIR technique may be applied. Bhalla et al. (1) also suggested that PAIR is indicated for cysts classified as WHO CE1, CE2, and CE3; for infected cysts; for pregnant women or patients refusing surgery; for recurrent cases unresponsive to medical therapy alone; and for multiple cysts that are accessible to puncture. In addition, Theodossis emphasized that guided interventional approaches should be considered for patients refusing surgery while also highlighting that surgical management remains the most effective treatment modality (11).

Although surgery remains the most effective treatment according to the literature, Aziz et al. (3), in their 2025 article, emphasized that each patient should be individually assessed to determine an appropriate treatment plan. In our case, after abscess drainage, the patient was given albendazole treatment by the infectious disease department, followed by PAIR therapy, which is consistent with the indications described in the literature for patients unsuitable for surgery.

Puncture, aspiration, injection, reaspiration has been reported to have a high recurrence rate and spillage risk, according to Mihetiu et al. (5). Eckert and Deplazes (2) indicate that the PAIR technique should always be performed by experienced physicians to minimize complications. In another retrospective analysis published in 2024, Mihetiu et al. (8) further indicated that although PAIR treatment is minimally invasive, shortens hospital stay, can be performed under local anesthesia, and is applicable in patients refusing surgery, it is also associated with a higher recurrence rate and contamination risk. Although numerous articles in the literature highlight the potential complications of this procedure, such as spillage, the present case provides imaging evidence of these complications and raises awareness of the issue. Finally, in our case, the MoCaT procedure—described by Akhan (12) in the early 2000s and used for the treatment of WHO CE2 and CE3b type cysts—was applied as the final treatment modality (4).

Our case is distinctive because of the unusual sites of the hydatid cysts' involvement and, to the best of our knowledge, represents the first documented instance of subcutaneous seeding following PAIR treatment of hydatid cysts. This case highlights the potential for the formation of new cysts due to seeding during treatment, particularly in atypical locations such as subcutaneous tissue. In managing such cases, close monitoring and careful follow-up are imperative.

Ethics

Informed Consent: All necessary informed consent was obtained from the patient prior to the procedures

Footnotes

Authorship Contributions

Surgical and Medical Practices: K.C., M.B.A., Z.O.E., V.E., F.S., Concept: K.C., M.B.A., Z.O.E., V.E., F.S., Design: K.C., M.B.A., Data Collection or Processing: K.C., M.B.A., Z.O.E., V.E., F.S., Analysis or Interpretation: K.C., M.B.A., Literature Search: K.C., Writing: K.C., M.B.A., Z.O.E., V.E., F.S., Concept: K.C., M.B.A., Z.O.E., V.E., F.S.

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