Dyad of Infantile Cutaneous and Thymic Langerhans Cell Histiocytosis: Is it Rare?

E.L. Goldstein¹, E.G. White², Nicole Giamanco¹, and V.J. Rooks¹

¹Tripler Army Medical Center
²Uniformed Services University of the Health Sciences

May 24, 2023

Abstract

Langerhans cell histiocytosis (LCH) is a rare neoplastic disorder characterized by abnormal proliferation of Langerhans cells affecting predominantly pediatric populations [1]. LCH encompasses a spectrum of disease with a range of presentations spanning many organ systems [1]. Thymic involvement (TI) is rarely described; however, we report a case of an 8-month-old female with a dyad of cutaneous and thymic LCH. Following initial subtle findings of thymic calcifications on staging non-contrast computed tomography (CT) scan, TI was clearly characterized via superficial chest and neck ultrasound. In this case, discovery of TI impacted the treatment plan. The purpose of this report is to highlight a potentially underdiagnosed manifestation of LCH in an 8-month-old infant and consider thymic sonography in staging evaluation for infants with LCH.

INTRODUCTION

The pathophysiology of LCH is poorly understood and presentation and prognosis are greatly varied [1]. Management of LCH is dependent on staging evaluation to describe the extent of disease [2]. The most common manifestations of LCH involve focal osseous disease, while visceral and cutaneous involvement are less commonly described. TI is especially rare, affecting only 2.6% of patients with LCH, most typically infants [3].

Diagnosis of TI is typically made via imaging and is most clearly recognized on ultrasound or magnetic resonance imaging (MRI), although dedicated evaluation of the asymptomatic thymus is not usually performed.
Thymic involvement may be characterized by thymic enlargement, abnormal thymic contour, thymic calcifications, or thymic cysts, and may present with compressive mediastinal symptoms or be asymptomatic [4]. Punctate calcifications are specific for thymic LCH [4]. Thymic LCH Thymic disease appears to respond to chemotherapy alongside systemic and cutaneous disease, but recurrence is possible [5]. The prognostic significance of TI in LCH is unknown [6].

RESULTS

Case Presentation and Imaging Findings

The patient initially presented at one month of age with skin lesions and pruritus suspicious for atopic dermatitis. After failure of conservative therapy she underwent skin biopsy confirming cutaneous LCH. Staging evaluation was initiated at eight months of age. The patient had no personal medical history or family history and had no additional symptoms at the time.

Skeletal survey, MRI of the bilateral tibia and fibula, MRI of the brain, and abdominal ultrasound showed no evidence of visceral or osseous disease. Non-contrast chest CT showed no evidence of lung involvement, however multiple scattered low-density calcifications (110-130 Hounsfield units) were visualized in the thymus (Fig. 1). These findings were subtle and would likely have been missed on a contrast-enhanced study. Superficial chest ultrasound was performed and demonstrated multiple 2-3 mm punctate echogenic foci which correlated with prior CT findings (Fig. 2). Differential diagnosis favored thymic LCH given history. Subsequent biopsy confirmed thymic LCH. Discovery of TI was this patient’s only visceral manifestation of LCH, and therefore changed the diagnosis to multisystem LCH necessitating chemotherapy treatment.

The patient’s clinical symptoms were initially limited to diffuse cutaneous lesions and pruritus, however she later developed cough and dyspnea, which could be related to thymic enlargement. She was managed with systemic chemotherapy. Upon completion of the chemotherapy course, follow-up ultrasound showed no visible thymic tissue (and therefore also no thymic calcifications), likely representing a positive response to therapy.

DISCUSSION

Thymic LCH is a rare finding described only by a handful of isolated case reports [3]. Imaging findings of thymic LCH range widely in character and extent. In the case we report, thymic calcifications found on non-contrast CT are very faint and could be dismissed as artifact. If contrast CT were used, the lesions could have been easily missed. Specific findings of TI have been clearly visualized on superficial thoracic ultrasound in both our case report and prior reports, but despite being a promising diagnostic modality, sonography is not typically included in LCH work-up [4].

TI is significant in management of LCH as it can implicate multisystem disease, which may provide indication for chemotherapy as seen in this case [2]. The prognostic significance of TI in LCH is currently unknown due to limited data and research [6].

Since ultrasonography is not a standard component of LCH staging evaluation and thymic findings can be subtle on CT, we suspect that thymic LCH may be more common than currently realized. We suggest that thymic ultrasonography during LCH staging may be warranted in infants. Sonographic evaluation of the thymus is a safe and minimally invasive assessment that can yield findings specific for TI, which may significantly impact treatment in certain cases.

This report highlights a dyad of cutaneous and thymic LCH in an infant discovered as an incidental finding on non-contrast CT of the chest. This dyad is likely underestimated, as CT findings may be subtle or masked by contrast. Ultrasound findings in this case were clear and provided a key step in diagnosis. Literature review supports the efficacy of sonographic evaluation and specificity of sonographic findings for thymic LCH. Given that ultrasonography is not standard in staging evaluation of LCH, we suspect that thymic LCH is underdiagnosed and the dyad described in this case is rare, but not unique. Considering the possible impact
of diagnosing thymic LCH on patient management, we propose thymic ultrasound during staging of LCH, especially in infant populations.

CONFLICT OF INTEREST STATEMENT

The views expressed in this publication those of the authors and do not necessarily reflect the official policy of the Department of Defense, Department of the Army, U.S. Army Medical Department, Uniformed Services University of the Health Sciences, or the U.S. Government.

REFERENCES


LEGENDS
Figure 1: Non-contrast chest CT scan, sagittal view, taken during staging evaluation. Faint calcifications demonstrated within anterior mediastinum.

FIGURE 1: Non-contrast chest CT scan, sagittal reconstruction obtained during staging evaluation. Faint calcifications demonstrated within anterior mediastinum.
FIGURE 2: Superficial chest ultrasound, longitudinal view, obtained as follow-up to incidental findings on chest CT. Multiple 2-3 mm punctate calcifications visualized within the central thymus.