

## CLINICAL IMAGE

# Breast implant–associated anaplastic large-cell lymphoma

Katrina Collins  | Joseph A. DiGiuseppe 

Department of Pathology, Hartford Hospital, Hartford, Connecticut

**Correspondence**Joseph A. DiGiuseppe, Department of Pathology, Hartford Hospital, Hartford, CT.  
Email: joseph.digiuseppe@hhchealth.org**Key Clinical Message**

In patients with suspected breast implant–associated anaplastic large-cell lymphoma, cytologic evaluation of fine-needle aspirate specimens from the peri-implant seroma, together with flow cytometric immunophenotyping and immunohistochemistry, represents a suitable preoperative diagnostic approach when planning for surgical management.

**KEY WORDS**

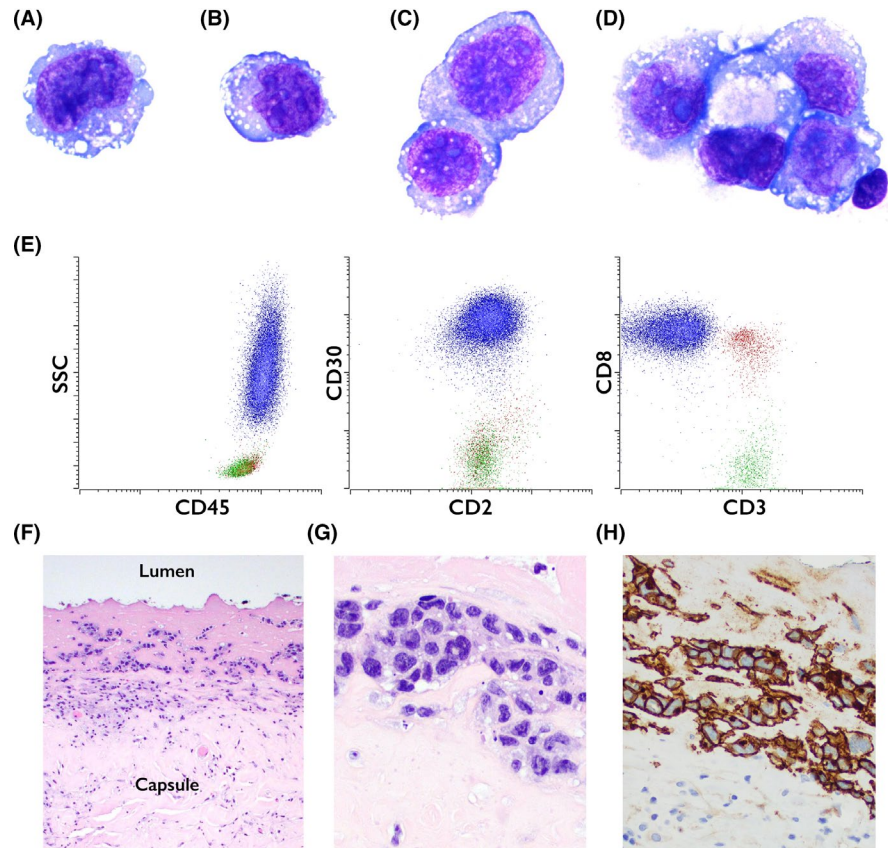
anaplastic large-cell lymphoma, breast implant, breast lymphoma, flow cytometry

A 50-year-old woman with a history of left breast cancer, treated with mastectomy and radiation therapy followed by breast reconstruction with textured silicone-gel implants five years prior, presented with new-onset left breast swelling. Microscopic examination of aspirated periprosthetic fluid revealed large, pleomorphic cells (Figure 1A–D). By flow cytometry (Figure 1E; abnormal cells: blue; normal CD4+ T cells: green; normal CD8+ T cells: red), most of the cells were CD45+ leukocytes with abnormally high side scatter (SSC). The abnormal cells were positive for CD30, and expressed several T-cell antigens (CD2, CD5, CD7, and CD8; Figure 1E and not shown), but were CD3- (Figure 1E). PCR studies demonstrated clonal T-cell receptor  $\gamma$ -chain gene rearrangement. A diagnosis of breast implant–associated anaplastic large-cell lymphoma was made. The subsequently excised periprosthetic capsule (Figure 1F,G) contained large, pleomorphic cells between a layer of eosinophilic material adjacent to the capsular lumen and the underlying capsule. By immunohistochemistry, the neoplastic cells were positive for CD30 (Figure 1H); ALK-1 was negative (not shown).

Breast implant–associated anaplastic large-cell lymphoma (BIA-ALCL) is a recently recognized provisional

diagnostic entity in the Revised 4th Edition of the WHO classification of lymphoid neoplasms.<sup>1</sup> This rare form of T-cell non-Hodgkin lymphoma, which appears to be related to textured implants, arises after a highly variable latency that averages approximately 10 years.<sup>2,3</sup> Patients most commonly present with a collection of fluid around the implant (seroma), often associated with swelling, pain, asymmetry, or mass lesion in the breast or armpit.<sup>4,5</sup> Although optimal management has not yet been firmly established, complete surgical excision of the periprosthetic capsule with implant removal is considered important.<sup>5</sup> Preoperative diagnosis of BIA-ALCL is therefore helpful in planning surgical management. Because the neoplastic cells are commonly suspended within the seroma fluid, cytologic evaluation of fine-needle aspirate specimens, together with flow cytometric immunophenotyping<sup>6,7</sup> and immunohistochemistry, represents a suitable preoperative diagnostic approach, as illustrated in the current case.

This work was presented in preliminary form at the College of American Pathologists 2018 Annual Meeting (CAP18).<sup>8</sup>



**FIGURE 1** Microscopic examination of aspirated periprosthetic fluid revealed large, pleomorphic cells (A-D). By flow cytometry (E; abnormal cells: blue; normal CD4+ T cells: green; normal CD8+ T cells: red), most of the cells were CD45+ leukocytes with abnormally high side scatter (SSC). The abnormal cells were positive for CD30, and expressed several T-cell antigens (CD2, CD5, CD7, and CD8; E and not shown), but were CD3- (E). The subsequently excised periprosthetic capsule (F,G) contained large, pleomorphic cells between a layer of eosinophilic material adjacent to the capsular lumen and the underlying capsule. By immunohistochemistry, the neoplastic cells were positive for CD30 (H); ALK-1 was negative (not shown)

## CONFLICT OF INTEREST

None declared.

## AUTHOR CONTRIBUTION

KC and JD: contributed to the design and implementation of the research, analysis of the results, and writing of the manuscript.

## ORCID

Katrina Collins  <https://orcid.org/0000-0002-9603-6731>

Joseph A. DiGiuseppe  <https://orcid.org/0000-0002-2063-8832>

## REFERENCES

1. Swerdlow SH, Campo E, Harris NL, et al (Eds). *WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues (Revised 4th edition)*. IARC: Lyon; 2017:421.
2. Ye X, Shokrollahi K, Rozen WM, et al. Anaplastic large cell lymphoma (ALCL) and breast implants: breaking down the evidence. *Mutat Res Rev Mutat Res*. 2014;762:123-132.
3. Miranda RN, Aladily TN, Prince HM, et al. Breast implant-associated anaplastic large-cell lymphoma: long-term follow-up of 60 patients. *J Clin Oncol*. 2014;32(2):114-120.
4. Clemens MW, Miranda RN. Coming of age: breast implant-associated anaplastic large cell lymphoma after 18 years of investigation. *Clin Plast Surg*. 2015;42(4):605-613.
5. Clemens MW, Medeiros LJ, Butler CE, et al. Complete surgical excision is essential for the management of patients with breast implant-associated anaplastic large-cell lymphoma. *J Clin Oncol*. 2016;34(2):160-168.
6. Wu D, Allen CT, Fromm JR. Flow cytometry of ALK-negative anaplastic large cell lymphoma of breast implant-associated effusion and capsular tissue. *Cytometry B Clin Cytom*. 2015;88(1):58-63.
7. Montgomery-Goecker C, Fuda F, Krueger JE, Chen W. Immunophenotypic characteristics of breast implant-associated anaplastic large-cell lymphoma by flow cytometry. *Cytometry B Clin Cytom*. 2015;88(5):291-293.
8. Collins K, DiGiuseppe JA. CD8+ breast implant-associated anaplastic large cell lymphoma: immunophenotypic characterization by flow cytometry. (2018) Abstracts and Case Studies from the College of American Pathologists 2018 Annual Meeting (CAP18). *Arch Pathol Lab Med*. 2018;142:e60.

**How to cite this article:** Collins K, DiGiuseppe JA. Breast implant-associated anaplastic large-cell lymphoma. *Clin Case Rep*. 2019;7:1106-1107. <https://doi.org/10.1002/ccr3.2135>