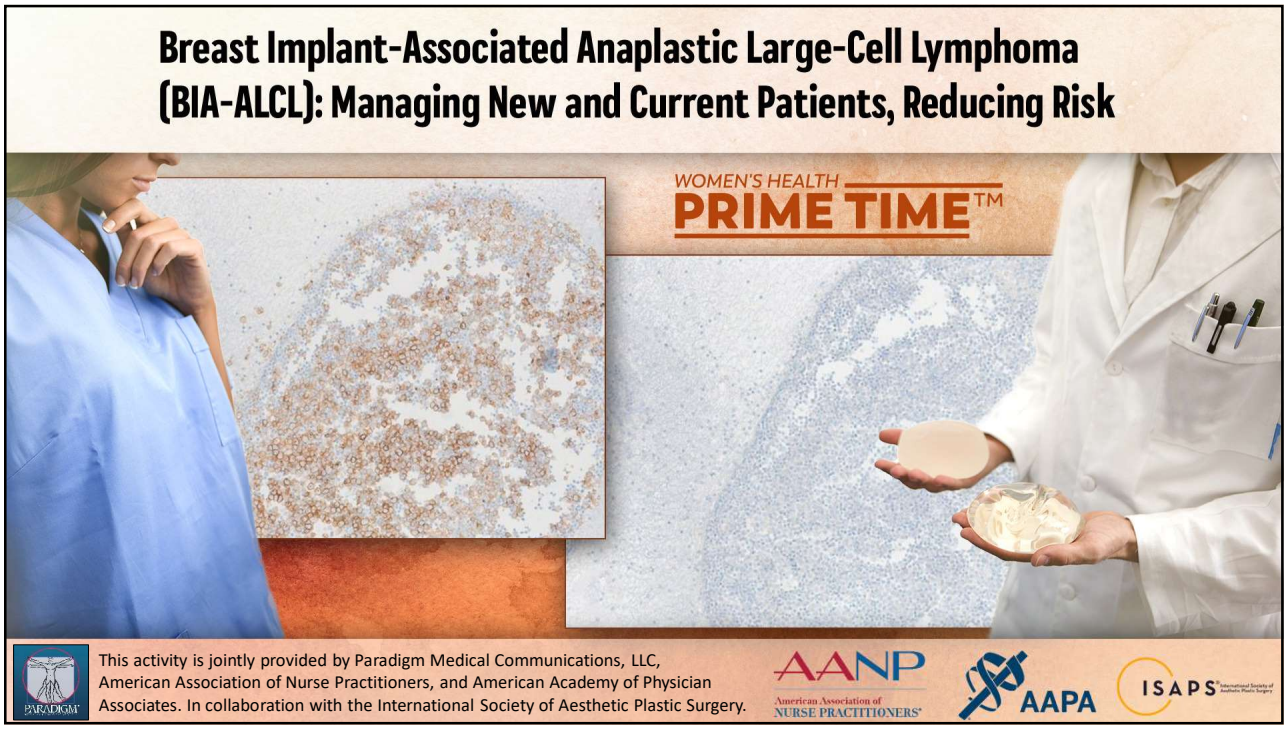
Breast Implant-Associated Anaplastic Large-Cell Lymphoma (BIA-ALCL): Managing New and Current Patients, Reducing Risk



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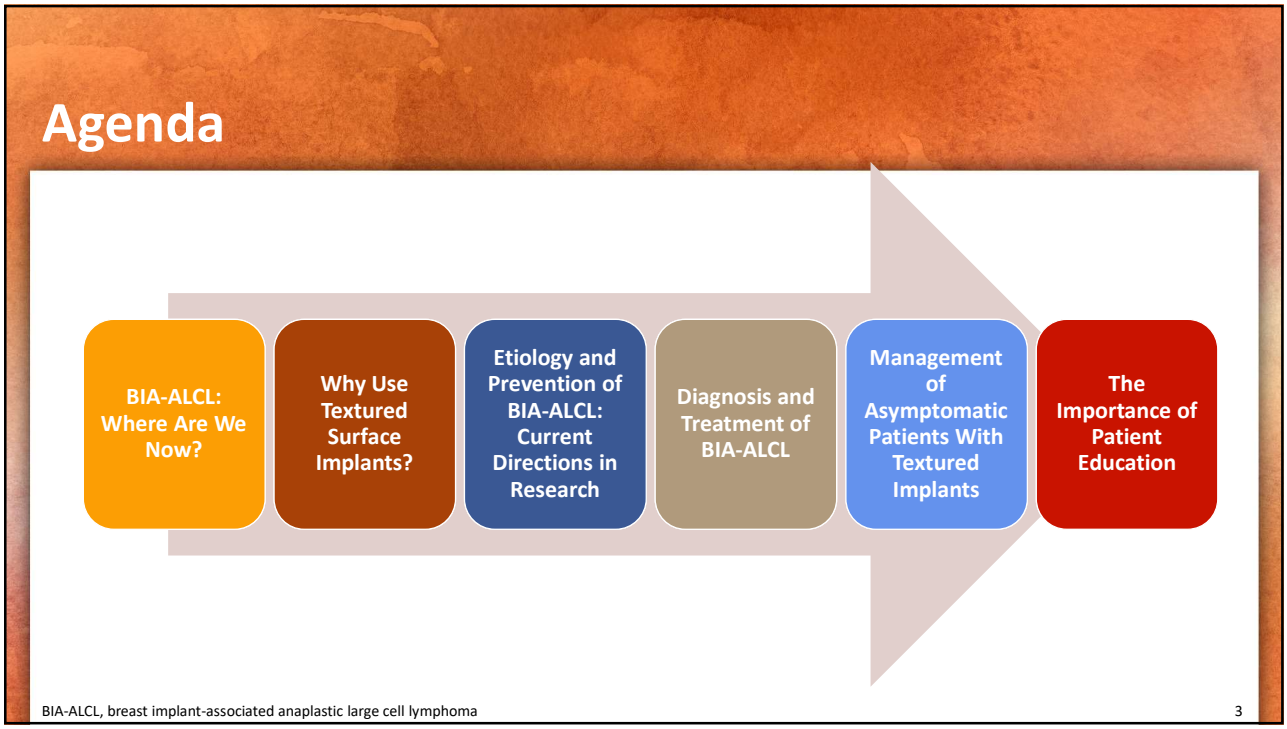
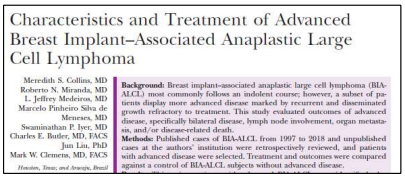


Breast Implant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL)

- Uncommon and emerging peripheral T-cell lymphoma[1]
- Most frequently arises around textured breast implant or patient with history of textured implant[1]
- Commonly presents with delayed periprosthetic effusion and breast asymmetry >1 y (avg 7-9 y) postimplantation[2]
  - Rarely presents with a mass, regional lymphadenopathy, overlying skin rash, pain, and/or capsular contracture[2,3]
- Typically localized to involved breast[4]
  - Most patients exhibit indolent clinical course with slow disease progression[2]
  - Regional lymph node metastasis and more rarely distant organ and bone marrow metastasis may be seen in advanced stages[3]
  - Excellent prognosis with diagnosis at early stage[2]


Characteristics and Treatment of Advanced Breast Implant–Associated Anaplastic Large Cell Lymphoma

Meredith S. Collins, MD
Roberto N. Miranda, MD
L. Jeffrey Medeiros, MD
Marcelo Pinheiro Silva de Menezes, MD
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Jun Liu, PhD
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Background: Breast implant-associated anaplastic large cell lymphoma (BIA-ALCL) most commonly follows an indolent course; however, a subset of patients display more advanced disease marked by recurrent and disseminated growth refractory to treatment. This study evaluated outcomes of advanced disease, specifically bilateral disease, lymph node involvement, organ metastasis, and/or disease-related death.

Methods: Published cases of BIA-ALCL from 1997 to 2018 and unpublished cases at the authors' institution were retrospectively reviewed, and patients with advanced disease were selected. Treatment and outcomes were compared against a control of BIA-ALCL subjects without advanced disease.

1. Mehta-Shah N et al. *Blood*. 2018;132(18):1889-1898. 2. NCCN Guidelines Version 1.2020 Breast implant-associated ALCL. Accessed 3/18/22. https://biaalcl.com/wp-content/uploads/NCCN-Guidelines-January-2020.pdf 3. Collins MS et al. *Plast Reconst Surg*. 2019;143(3S):41S-50S. 4. Lee JH. *Yeungnam Univ J Med*. 2021;38(3):175-182.

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Examples of Breast Effusion and Rash Due to BIA-ALCL

Effusion in reconstructed left breast

Effusion in augmented left breast

Subtle effusion in augmented left breast, masked due to underlying physiological asymmetry, with bigger and more redundant right breast

Rash of lower inner quadrant of right breast preceded appearance of BIA-ALCL mass at same site

From Turton P et al. *J Plast Reconstr Aesthet Surg*. 2021;74(1):13-29. (CCBY-NC-ND 4.0) http://creativecommons.org/licenses/by/4.0

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Most Recent Statistics: 1/29/22

ASPS BIA-ALCL Global Network -- January 28, 2022 – 1,158 Total World Cases, 35 Deaths

	Patients	Deaths
Argentina	15	1
Australia	121	4
Austria	6	
Belgium	15	
Brazil	31	1
Bulgaria	1	
Canada	38	1
Chile	2	
China	1	
Columbia	17	1
Croatia	1	
Czech Republic	1	

	Patients	Deaths
Denmark	13	
Egypt	1	
Finland	14	
France	86	5
Germany	35	
Greece	1	
Hungary	1	
Ireland	2	
Israel	9	
Italy	73	2
Japan	2	
France	86	5

	Patients	Deaths
Malaysia	1	
Mexico	14	
Netherlands	70	2
New Zealand	18	1
Norway	6	
Panama	1	
Poland	10	
Portugal	1	
Romania	1	
Russia	4	
Singapore	1	
Slovenia	1	

	Patients	Deaths
South Africa	3	
South Korea	3	
Spain	61	3
Sweden	8	2
Switzerland	10	1
Taiwan	1	
Thailand	1	
Turkey	4	
United Kingdom	78	3
United States	**373**	**8**
Venezuela	2	
TOTAL	**1,158**	**35**

Data from ASPS Global Network and European Taskforce.
Presented by Mark Clemens, MD, at the 37th Annual Atlanta Breast Surgery Symposium, January 28-30, 2022.

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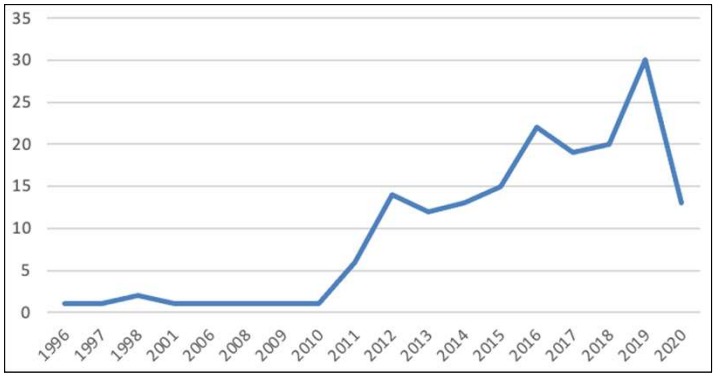
BIA-ALCL Diagnosis By Year

- In 2020 the number of diagnosed cases **decreased**
- Was there a reduction in cases or a reduction in diagnosis/reporting of cases?



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Estimated Risk of BIA-ALCL

Study Author	Year	Estimated Risk
Keech KA Jr, et al[1]	1997	Association
de Jong D, et al[2]	2008	1/3 million
US FDA[3]	2011	1/3 million
Ye X, et al[4]	2014	1/500,000
Doren EL, et al[5]	2017	1/30,000
Loch-Wilkinson A, et al[6]	2017	1/4000
McGuire P, et al[7]	2017	1/2200
de Boer M, et al[8]	2018	1/35,000
Magnussen MR, et al[9]	2018	1/3000
Cordeiro P, et al[10]	2020	1/355

1. Keech KA Jr et al. *Plast Reconstr Surg.* 1997;100(2):554-555. 2. de Jong D et al. *JAMA.* 2008;300(17):2030-2035. 3. US Food and Drug Administration. Anaplastic large cell lymphoma (ALCL) in women with breast implants: preliminary FDA findings and analyses. January 2011. Accessed 4/28/11. http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/ImplantsandProsthetics/BreastImplants/ucm239996.htm#review 4. Ye X et al. *Mutat Res Rev Mutat Res.* 2014;762:123-132. 5. Doren EL et al. *Plast Reconstr Surg.* 2017;139(5):1042-1050. 6. Loch-Wilkinson A et al. *Plast Reconstr Surg.* 2017;140(4):645-654. 7. McGuire P et al. *Plast Reconstr Surg.* 2017;139(1):1-9. 8. de Boer M et al. *JAMA Oncol.* 2018;4(3):335-341. 9. Magnusson MR et al. *Aesthet Plast Surg.* 2018;42(4):1164-1166. 10. Cordeiro PG et al. *J Plast Reconstr Aesthet Surg.* 2020;73(5):841-846.

What's Your Micromort?

- The term "micromort" was introduced in 1979 by Ronald Howard as a person's risk of dying as **1 in a million**
  - **For a woman with bilateral breast implants, the risk of death from BIA-ALCL is 0.4 micromorts**
- This information is important for counseling new patients and those presenting with delayed onset seromas

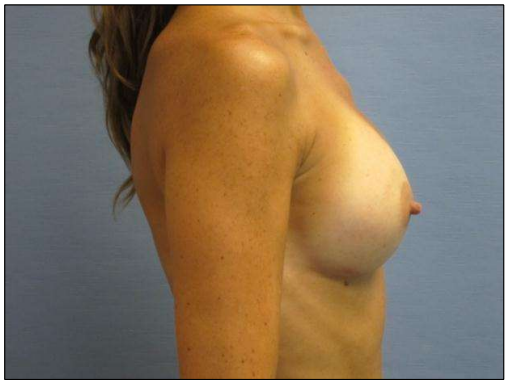
Activity	Micromort	Relative Value to BIA-ALCL Micromort
BIA-ALCL Micromort	**0.4**	–
Skiing 1 d in the US	0.77	2x
Drinking 0.5 L of wine	1	2.5x
Riding a bike 17 miles	1	2.5x
Traveling 230 miles by car	1	2.5x
1000 miles by plane	1	2.5x
Driving a car 1 h per d	2	5x

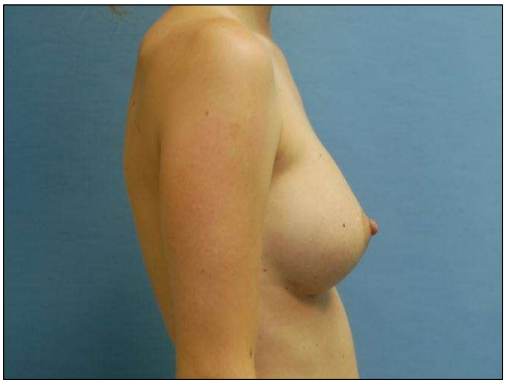
Sieber DA, Adams WP Jr. *Aesthet Surg J.* 2017;37(8):887-891.

Why Use Textured Surface Implants?

Patricia A. McGuire, MD, FACS

Round Vs Anatomic Implants





Photos courtesy of Patricia A. McGuire, MD, FACS

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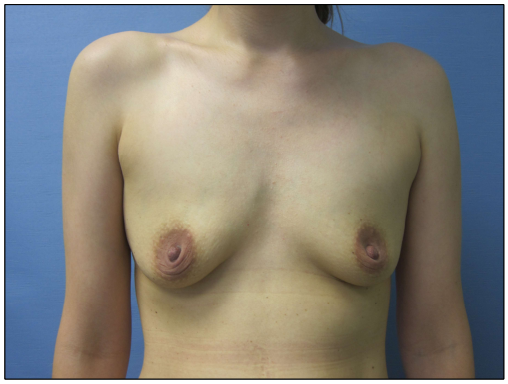
Constricted Breast: Shaped Implants Allow Volume to be Placed Where It is Needed



Photos courtesy of Patricia A. McGuire, MD, FACS

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Revision Reconstruction: Wrinkling With Smooth Gel Implants

Photos courtesy of Patricia A. McGuire, MD, FACS

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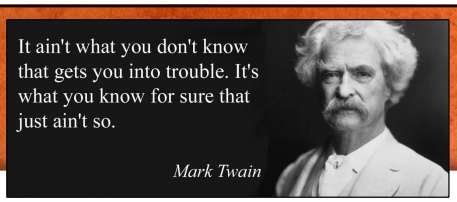
Etiology and Prevention of BIA-ALCL: Current Directions in Research

William P. Adams Jr, MD

Etiologies 101



- Implant shed/particles
- Heavy metal
- Leachables
- Mechanical friction

- **<u>CAN NOT</u>** cause lymphoma
  - Requires adaptive immune system
    - Biologic antigen
    - Antigen presenting cell
    - Lymphocytes
    - B/T receptors

Physical particles and similar
<u>DO NOT CAUSE</u> and <u>CAN NOT CAUSE</u> lymphoma
because they do not interact with the adaptive immune system

Deva AK et al. *Cancers.* 2020;12(12):3861.

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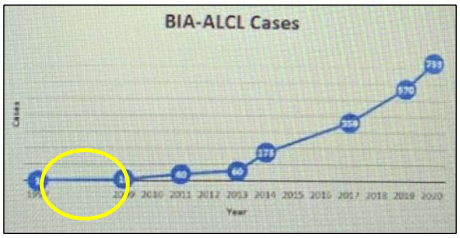
Etiologies 101

- Implant shed/particles
- Heavy metal
- Leachables
- Mechanical friction

X

- Epidemiology
  - Where were the cases in 2000?
    - Textured devices used exclusively
      - Internationally (1985-)
      - US significant* PU/other texture
        - 1980s -



Deva AK et al. *Cancers.* 2020;12(12):3861.

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Etiologies 101: Epidemiology and Logic

- Real World Data Revelation
  - Case distribution
    - Busier textured surgeons should **uniformly** have **more cases**
    - Sweden/Europe/South America
      - Very few cases
  - US
    - Higher # cases
    - Very low textured implant use

How is that possible?

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Etiologies 101: Pattern Generation

- Implant shed/particles
- Heavy metal
- Leachables
- Mechanical friction

X

- Epidemiology
  - Geographic distribution
    - Not uniform
  - Case clusters*
    - 17 multiple distinct clusters globally
      - US, Italy, New Zealand, Australia, Canada
    - Suggests infectious trigger
      - Not typical of physical particle

Deva AK et al. *Cancers.* 2020;12(12):3861. Loch-Wilkinson A et al. *Plast Reconstr Surg.* 2017;140(4):645-654.

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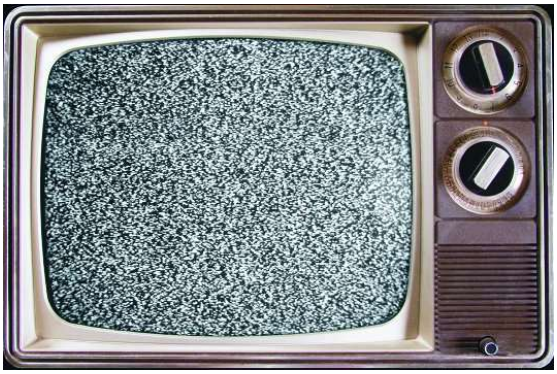
Pathogenesis – Unification Theory

Loch-Wilkinson A et al. *Plast Reconstr Surg*. 2017;140(4):645-654.

1. **Textured implant**
2. **Chronic inflammation**
3. Genetic predisposition
4. Time/environment for a critical level of inflammation



Loch-Wilkinson A et al. *Plast Reconstr Surg*. 2017;140(4):645-654.

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Etiologies 101: The Driver of Disease Had to Change–*Transformation*

- What changed 1999–2019?
  - Genetics
  - Implant texture
  - Time
  - Other?

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Etiologies 101: The Driver of Disease Had to Change—*Transformation*

- What changed 1999–2019?
  - Genetics
  - Implant texture
  - Time
  - **Bacteria**
    - Well documented in all medical fields

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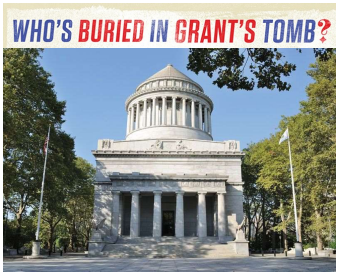
Etiologies 101: *Do You See ALCL in Other Implants?*

- Yes
  - T-cell and B-cell
    - Buttock implant, dental, ortho
      - Yes
    - Breast – more cases
      - WHY?

Clean Contaminated Site



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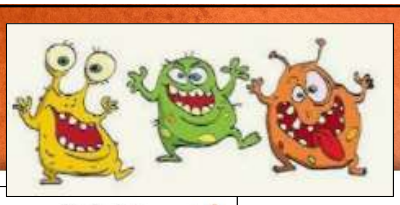
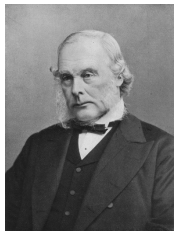
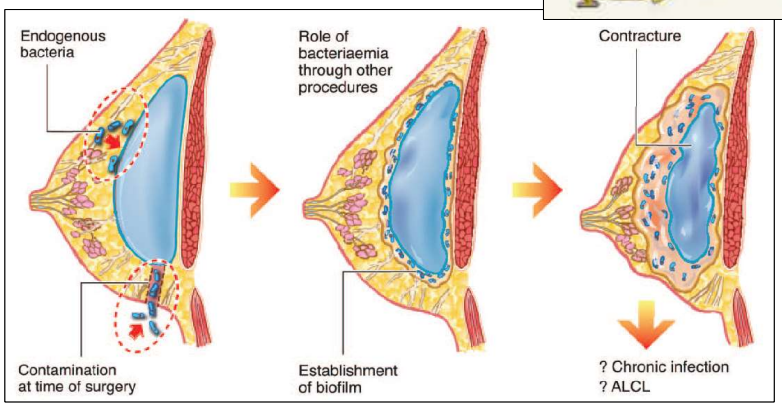
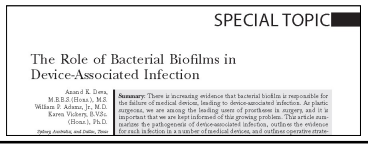
Bacteria/Biofilm Sequelae









Center figure reprinted with permission from Deva AK, Adams WP Jr, Vickery K. The role of bacterial biofilms in device-associated infection. *Plast Reconstr Surg.* 2013;132(5):1319-1328.

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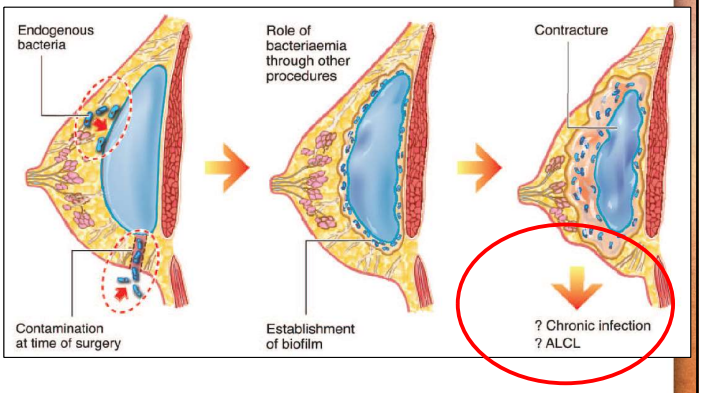
Etiologies: Bacteria/Biofilm

- Wealth of supportive date
  - Surface area issue
    - More surface area = more bacteria
    - More bacteria = more stim T cells
  - Biologic antigen
    - Transformation
      - CAN cause lymphoma
  - Similar to PC-ALCL
    - Known superantigen trigger
  - Microbiome
    - Driver disease
      - *H pylori*, MALT, gastric cancer
      - Celiac disease
      - Bacterial load
        - Implant surface area
    - **Host response – Cap Con analogue**
      - Gram negative for BIA-ALCL



MALT, mucosa-associate lymphoid tissues; PC-ALCL, primary cutaneous-anaplastic large cell lymphoma

Figure reprinted with permission from Deva AK, Adams WP Jr, Vickery K. The role of bacterial biofilms in device-associated infection. *Plast Reconstr Surg.* 2013;132(5):1319-1328.

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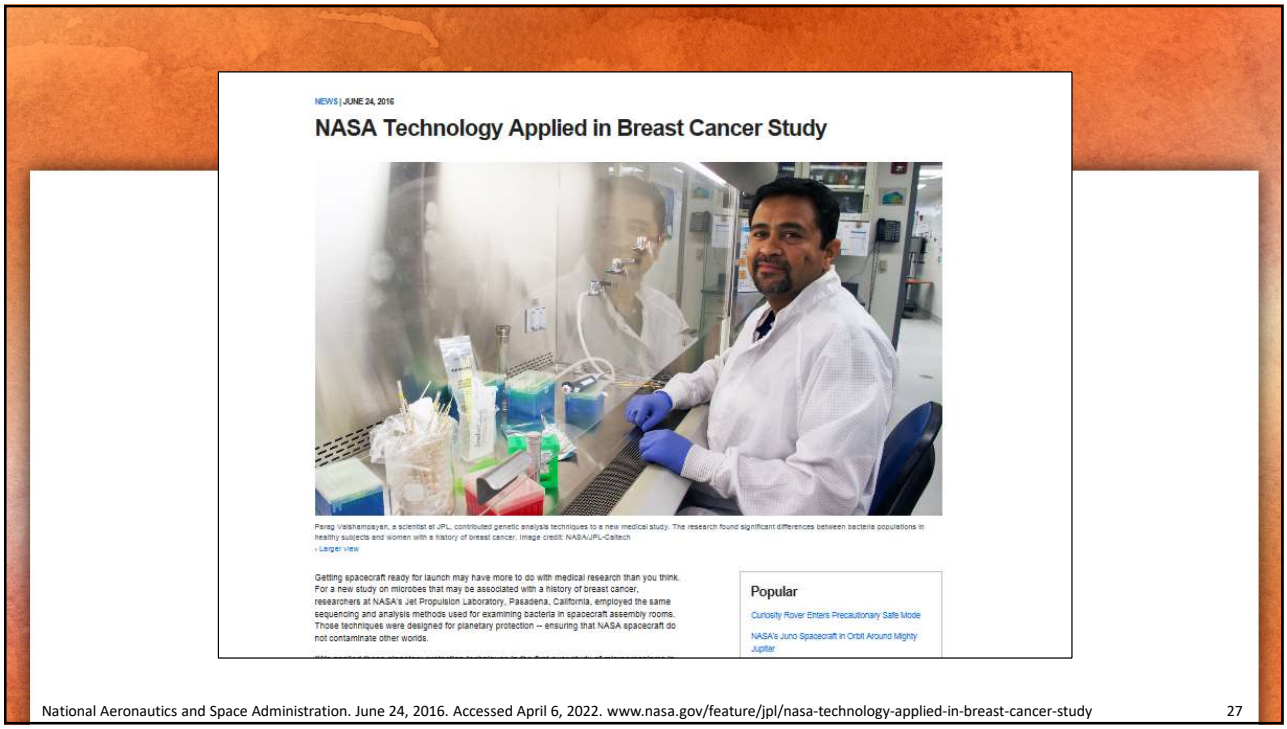

National Aeronautics and Space Administration. June 24, 2016. Accessed April 6, 2022. www.nasa.gov/feature/jpl/nasa-technology-applied-in-breast-cancer-study

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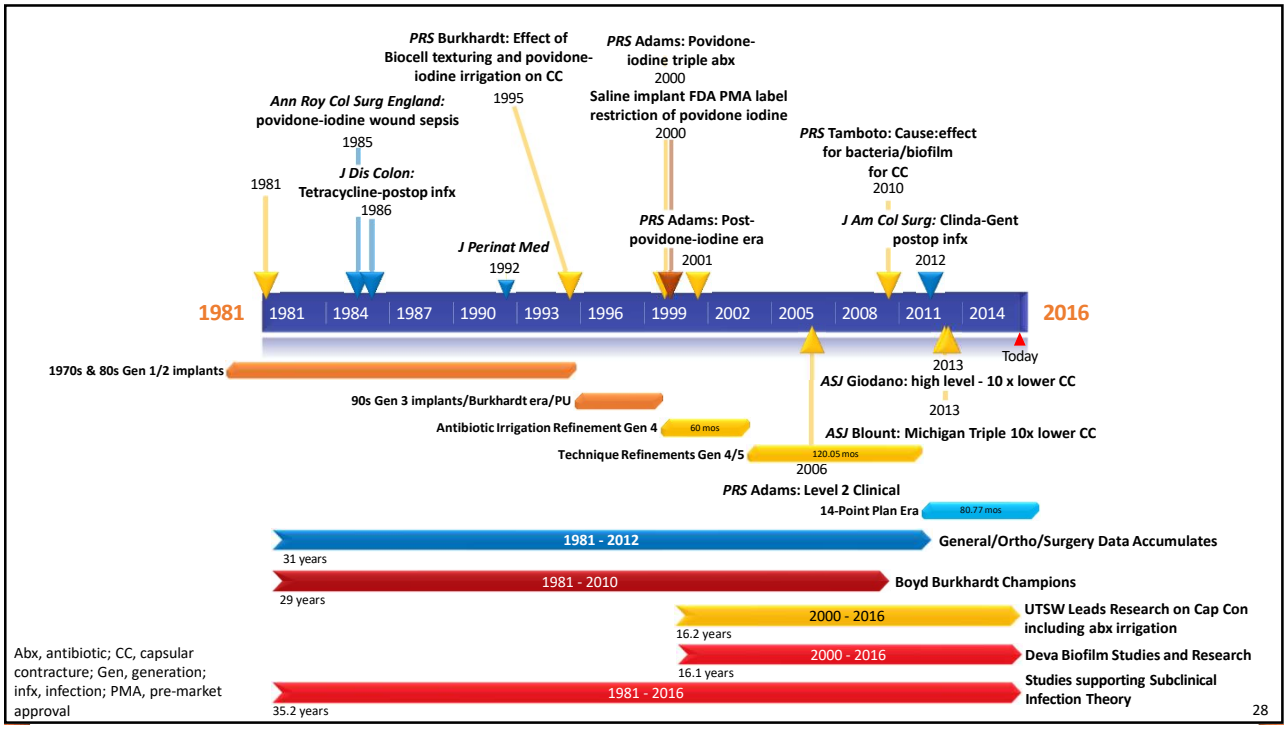

Abx, antibiotic; CC, capsular contracture; Gen, generation; infx, infection; PMA, pre-market approval

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Prevention: Talk the Talk…Walk the Walk
Just Do it!

SPECIAL TOPIC

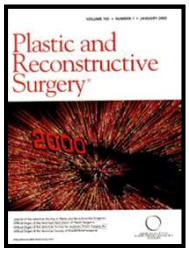
The Role of Bacterial Biofilms in Device-Associated Infection

Anand K. Deva, M.B.B.S. (Hons.), M.S.
William P. Adams, Jr., M.D.
Karen Vickery, B.V.Sc. (Hons.), Ph.D.
Sydney, Australia, and Dallas, Texas

Summary: There is increasing evidence that bacterial biofilm is responsible for the failure of medical devices, leading to device-associated infection. As plastic surgeons, we are among the leading users of prostheses in surgery, and it is important that we are kept informed of this growing problem. This article summarizes the pathogenesis of device-associated infection, outlines the evidence for such infection in a number of medical devices, and outlines operative strategies aimed at reducing the risk of bacterial contamination at the time of device deployment. It also outlines strategies under investigation to combat the development of device-associated infection. (*Plast. Reconstr. Surg.* 132: 1319, 2013.)

There is increasing evidence that the failure of many medical devices is a result of bacterial

This article summarizes the pathogenesis of device-associated infection, outlines the evidence




Cosmetic

Optimizing Breast Pocket Irrigation: An in Vitro Study and Clinical Implications

Deva AK et al. *Plast Reconstr Surg.* 2013;132(5):1319-1328. Adams WP Jr et al. *Plast Reconstr Surg.* 2000;105(1):334-338.

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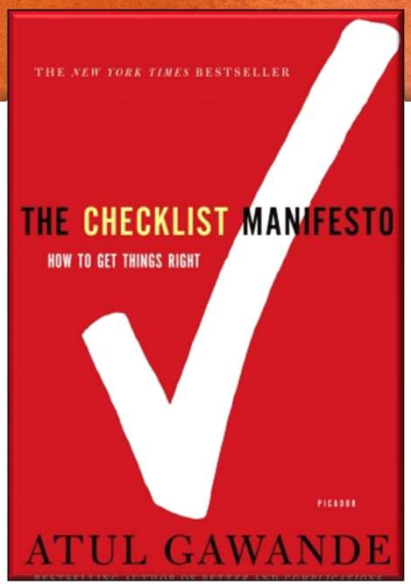
- Complex decision making
  - Requires established processes
    - "Checklists"
- Breast pocket preparation
  - 18 years surgeons <u>plagued</u>
    - Wrong antibiotic mix
    - Forgotten steps
    - "Distractions"
      - Points of contamination
      - Increased bacterial **<u>load</u>**



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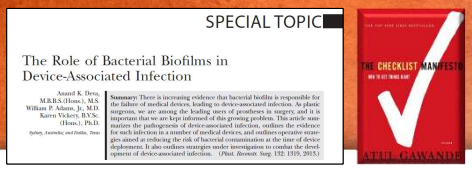
14-Point Plan: Pocket Preparation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1. Use intravenous antibiotic prophylaxis at time of anesthetic induction
2. Avoid periareolar/transaxillary incisions; these have been shown to lead to a higher rate of contracture
3. Use nipple shields to prevent spillage of bacteria into pocket
4. Perform careful atraumatic dissection to minimize devascularized tissue
5. Perform careful hemostasis
6. Avoid dissection into breast parenchyma
7. Use of dual-plane pocket has anatomic advantages
8. **Perform pocket irrigation with correct proven triple antibiotic solution or 50% (1:1 dilution) or stronger povidone-iodine**
9. **Steps to minimize skin contamination**
10. **Minimize implant open time and replacement of implant or sizers**
11. **Change surgical gloves prior to handling and use new or cleaned instruments and drapes**
12. **Avoid using a drainage tube, which can be potential site of entry for bacteria**
13. Use a layered closure
14. Use antibiotic prophylaxis to cover subsequent procedures that reach skin or mucosa

Adapted from Deva AK, Adams WP, Vickery K. *Plast Reconstr Surg.* 2013;132(5):1319-1328.

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Breast Implants and Bacteria/Biofilm Load

Bacteria = **Bad**

More Bacteria = **Worse**

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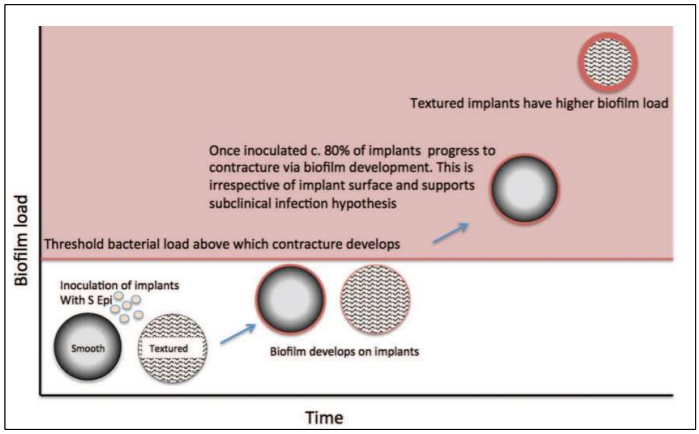
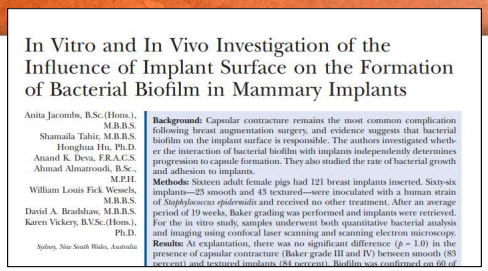
Load and Threshold





In Vitro and In Vivo Investigation of the Influence of Implant Surface on the Formation of Bacterial Biofilm in Mammary Implants

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Shamaila Tahir, M.B.B.S.
Honghua Hu, Ph.D.
Anand K. Deva, F.R.A.C.S.
Ahmad Almatroudi, B.Sc., M.P.H.
William Louis Fick Wessels, M.B.B.S.
David A. Bradshaw, M.B.B.S.
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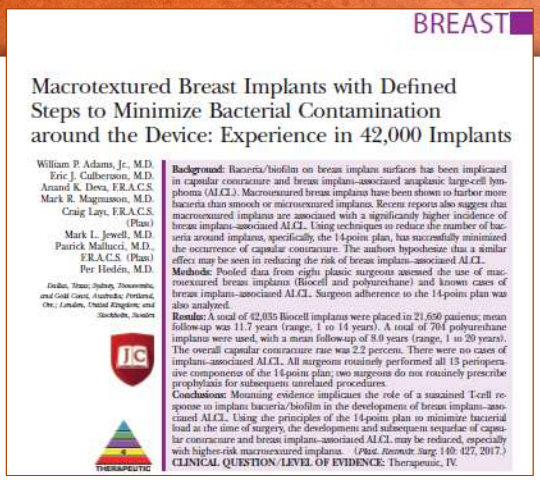
Sydney, New South Wales, Australia

Background: Capsular contracture remains the most common complication following breast augmentation surgery, and evidence suggests that bacterial biofilm on the implant surface is responsible. The authors investigated whether the interaction of bacterial biofilm with implants independently determines progression to capsule formation. They also studied the rate of bacterial growth and adhesion to implants.
Methods: Sixteen adult female pigs had 121 breast implants inserted. Sixty-six implants—23 smooth and 43 textured—were inoculated with a human strain of *Staphylococcus epidermidis* and received no other treatment. After an average period of 19 weeks, Baker grading was performed and implants were retrieved. For the in vitro study, samples underwent both quantitative bacterial analysis and imaging using confocal laser scanning and scanning electron microscopy.
Results: At explantation, there was no significant difference ($p = 1.0$) in the presence of capsular contracture (Baker grade III and IV) between smooth (83 percent) and textured implants (84 percent). Biofilm was confirmed on 60 of

Figure reprinted with permission from Jacombs A et al. In vitro and in vivo investigation of the influence of implant surface on the formation of bacterial biofilm in mammary implants. *Plast Reconstr Surg.* 2014:133(4):471e-480e.

Technique and Risk

- 42,000 macro-textured implants
- 14-Point plan
- 10-Year mean follow up
- Expected # ALCL = 15
- Actual # = 0



BREAST

Macrotextured Breast Implants with Defined Steps to Minimize Bacterial Contamination around the Device: Experience in 42,000 Implants

William P. Adams, Jr., M.D.
Eric J. Culberson, M.D.
Anand K. Deva, F.R.A.C.S.
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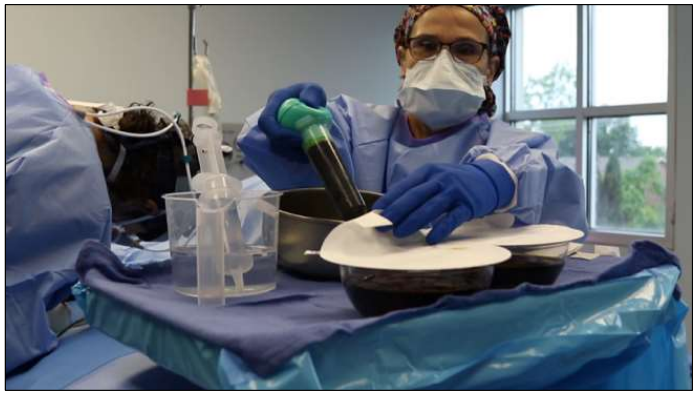
Background: Bacteria/biofilm on breast implant surfaces has been implicated in capsular contracture and breast implant–associated anaplastic large-cell lymphoma (ALCL). Macrotextured breast implants have been shown to harbor more bacteria than smooth or microtextured implants. Recent reports also suggest that macrotextured implants are associated with a significantly higher incidence of breast implant–associated ALCL. Using techniques to reduce the number of bacteria around implants, specifically, the 14-point plan, has successfully minimized the occurrence of capsular contracture. The authors hypothesize that a similar effect may be seen in reducing the risk of breast implant–associated ALCL.
Methods: Pooled data from eight plastic surgeons assessed the use of macrotextured breast implants (Biocell and polyurethane) and known cases of breast implant–associated ALCL. Surgeon adherence to the 14-point plan was also analyzed.
Results: A total of 42,035 Biocell implants were placed in 21,650 patients; mean follow-up was 11.7 years (range, 1 to 14 years). A total of 704 polyurethane implants were used, with a mean follow-up of 8.0 years (range, 1 to 20 years). The overall capsular contracture rate was 2.2 percent. There were no cases of implant–associated ALCL. All surgeons routinely performed all 13 perioperative components of the 14-point plan; two surgeons do not routinely prescribe prophylaxis for subsequent untreated procedures.
Conclusions: Mounting evidence implicates the role of a sustained T-cell response to implant bacteria/biofilm in the development of breast implant–associated ALCL. Using the principles of the 14-point plan to minimize bacterial load at the time of surgery, the development and subsequent sequelae of capsular contracture and breast implant–associated ALCL may be reduced, especially with higher-risk macrotextured implants. (*Plast. Reconstr. Surg.* 140: 427, 2017.)
CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, IV.

Adams WP Jr et al. *Plast Reconstr Surg.* 2017;140(3):427-431.

The Art of Breast Pocket Irrigation



- Concentration
- Contact time

Culbertson EJ et al. *Aesthet Surg J.* 2020;40(6):619-625.

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The Science of Breast Pocket Irrigation

	Approved BPI Around Implants	Standard Dilution Micro Test 1st Dilution	Protein Soil	Wound Healing Effects	Long-term Data Around Implants	Off shelf	Cost
50% Povidone-iodine							+
Povidone-iodine Triple							++
Non–Povidone-iodine Triple Antibiotic							+++
Chlorhexidine							++++
Dilute Chlorhexidine							++++
Hypochlorous Acid							++++
Cefazolin							+
Bacitracin							+

BPI, breast pocket irrigation

Adapted from Culbertson EJ et al. *Aesthet Surg J.* 2020;40(6):619-625.

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Avoid "Anecdotal" "Functional/Proven" Breast Irrigation

- **Povidone-iodine triple**
  - 50 mL povidone-iodine, 1 g cefazolin, 80 mg gentamycin, 500 mL NS
- **≥50% Povidone-iodine**
- Non–povidone-iodine triple
  - 50,000 U bacitracin, 1 g cefazolin, 80 mg gentamycin, 500 mL NS

Details Matter..

NS, normal saline; TAB, triple antibiotic

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What Can Surgeons Do?
Minimize Points of Contamination and Bacterial Load

- Proven methods to reduce capsular contracture **AND BEYOND**
  - **BEST DEFENSE** is a **GOOD OFFENSE**
  - 14-point plan ("best practice" concept)
  - "Uncomfortable" to talk about

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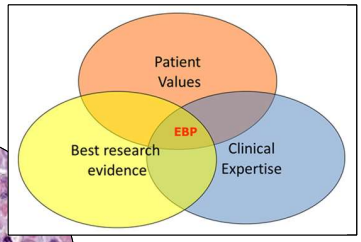
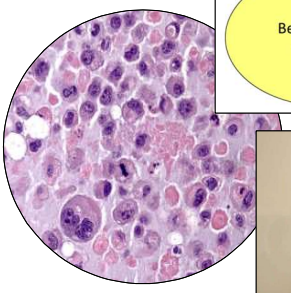
BIA-ALCL Clinical Practice Pearls

- Evidence-based practice (EBP)
- Povidone-iodine–containing irrigations
  - Best activity
  - Fewest tradeoffs
- Process is key
  - 14-Point plan





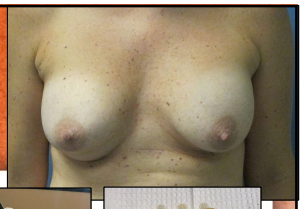
EBP figure from Sackett D et al. *Evidence-Based Medicine.* 2000. Churchill Livingstone.
Pathology image from Milito CB et al. *Hum Pathol Case Rep.* 2019;18:200340. (CCBY-NC-ND 4.0) http://creativecommons.org/licenses/by/4.0 39

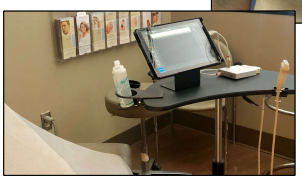
Diagnosis and Treatment of BIA-ALCL

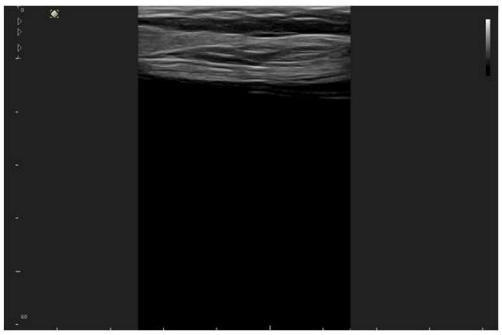
Patricia A. McGuire, MD, FACS

Work-up for Breast Implant Patients Presenting With Breast Swelling

- US shown to have higher sensitivity and specificity than CT or MRI
- FNA of fluid should be performed
- Fluid should be sent to pathology
- Communication with pathologist to rule out BIA-ALCL
  - Cytology: Immunohistochemistry and flow cytometry for T Cell markers, specifically, **CD30 cell surface protein**







CT, computed tomography; FNA, fine needle aspiration; MRI, magnetic resonance imaging; US, ultrasound

Photos and video courtesy of Patricia A. McGuire, MD, FACS

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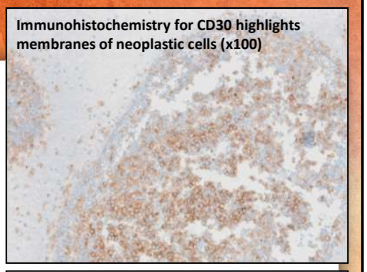
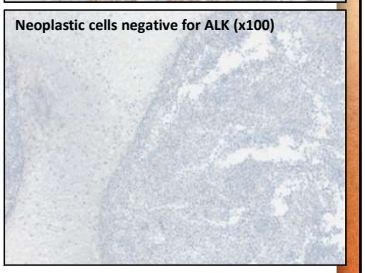
Diagnosis

- Later onset periprosthetic fluid that is CD30+, ALK-[1]
  - CD30+ alone may raise suspicion BUT diagnosis **not confirmed by CD30+ alone**[2]
- ≥50 mL fluid volume required to achieve accurate diagnosis[3]
  - Pathology review of first aspiration advisable
  - Prior serial aspirations may decrease tumor burden, make diagnosis more challenging
- Diagnosis **only made by cytological, immunohistochemical, and immunophenotypic evaluation of aspirated fluid and presence of ALK– pleomorphic leukocytes**[4]





ALK, anaplastic lymphoma kinase

1. Swerdlow SH et al. *Blood*. 2016;127(20):2375-2390. 2. Kadin ME et al. *Aesthet Surg J*. 2017;37(7):771-775. 3. NCCN Guidelines Version 1.2020 Breast implant-associated ALCL. Accessed 3/18/22. https://biaalcl.com/wp-content/uploads/NCCN-Guidelines-January-2020.pdf 4. Lyapichev KA et al. *Mod Pathol*. 2020;33(3):367-379.

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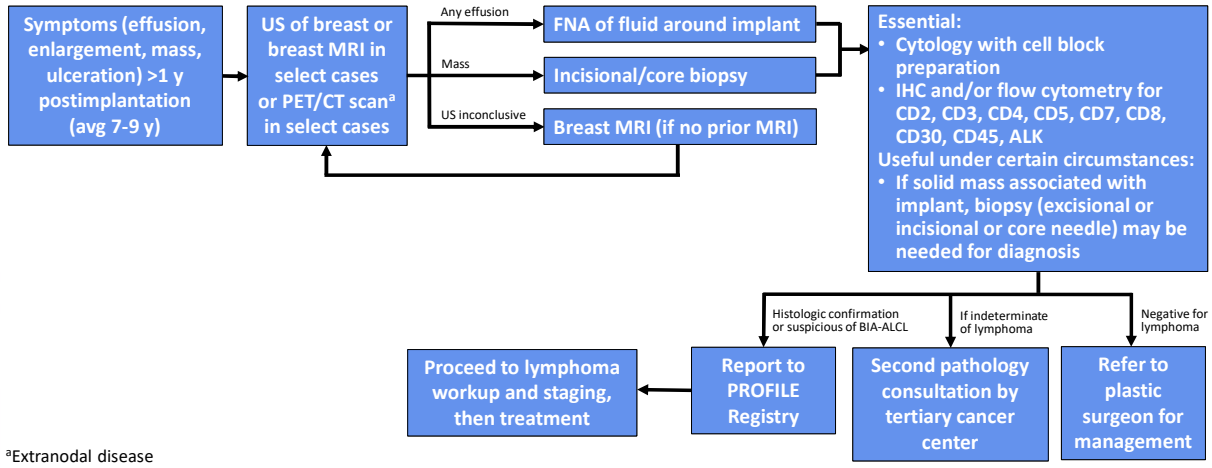
Presentation, Initial Workup, and Pathologic Workup of Symptomatic Patients (NCCN)



[a]Extranodal disease

PET, positron emission tomography; PROFILE, Patient Registry and Outcomes for Breast Implants and Anaplastic Large Cell Lymphoma Etiology and Epidemiology

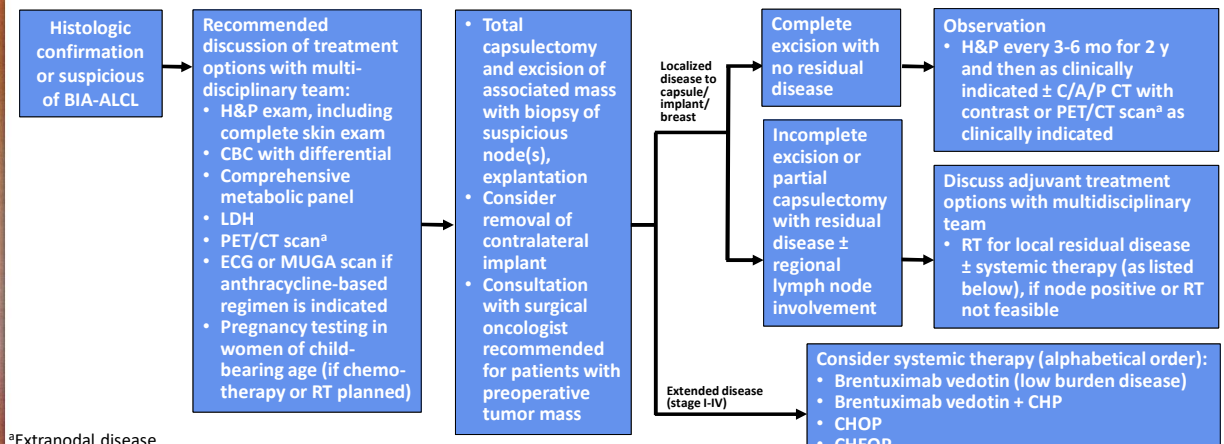
Adapted from NCCN Guidelines Version 1.2020 Breast implant-associated ALCL. Accessed 3/18/22. https://biaalcl.com/wp-content/uploads/NCCN-Guidelines-January-2020.pdf 43

Diagnosed BIA-ALCL

- Routine laboratory
  - CBC with differential
  - Metabolic panel, LDH, hepatitis B testing (if chemo may be required)
- PET scan
- Referral to oncologist

CBC, complete blood count; LDH, lactate dehydrogenase 44

BIA-ALCL: Lymphoma Workup, Staging, and Treatment (NCCN)



[a]Extranodal disease

C/A/P, chest/abdomen/pelvis; CBC, complete blood count; CHOEP, cyclophosphamide-hydroxyldaunorubicin-Oncovin-etoposide-prednisone; ECG, electrocardiogram; EPOCH, etoposide phosphate-prednisone-Oncovin-cyclophosphamide-doxorubicin; H&P, history and physical; LDH, lactate dehydrogenase; MUGA, multigated acquisition scan; RT, radiation therapy

Adapted from NCCN Guidelines Version 1.2020 Breast implant-associated ALCL. Accessed 3/18/22. https://biaalcl.com/wp-content/uploads/NCCN-Guidelines-January-2020.pdf

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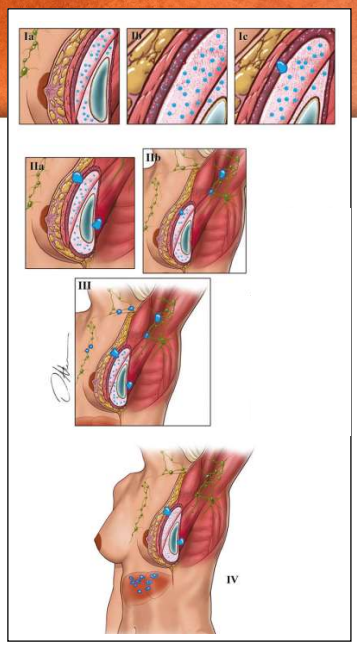
Established Treatment

- Total capsulectomy +/- implant replacement (smooth)
  - Curative (to date)
  - 100% of T1, T2, T3
  - Early detection is key

TNM Staging[1,2]				
Tumor Size	T1	T2	T3	T4
T	Confined to effusion	Early capsule invasion	Mass aggregate, confined to capsule	Tumor locally invasive out of capsule
Lymph Nodes	N0	N1	N2	
N	No lymph node involvement	One regional lymph node	Multiple regional lymph nodes	
Metastasis	M0	M1		
M	No distant spread	Other organs/distant sites		



TNM, tumor, node, metastasis

Clemens MW et al. *J Clin Oncol.* 2016;34(2):160-168. Clemens MW et al. *Aesthet Surg J.* 2017;37(3):285-289.
Figure at right reprinted with permission from Clemens MW 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.

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Management of Asymptomatic Patients With Textured Implants

Caroline Glicksman, MD, MSJ

Management of Asymptomatic Patients With Textured Implants: Key Questions

- Should all textured implants be removed based on FDA Biocell recall?
- Does a capsulectomy need to be performed on every texture revision or explantation case?
- What about a textured expander to permanent implant?
- Should the capsule be sent to pathology?
- What about the seroma fluid found at the time of explantation?

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Recall Due to Increased Risk of BIA-ALCL

- Voluntary July 2019 recall of Allergan Biocell textured breast implants and tissue expanders[1,2]
  - <5% of implants sold in US
- Does not affect Allergan's Natrelle smooth or Microcell breast implants and tissue expanders[2]
- **FDA does not currently recommend removal of these or other types of implants unless symptoms are present[1,2]**

Brand Sold in United States	Style/Model
Natrelle Biocell Saline-Filled Implants	163, 168, 363, 468
Natrelle 410 Highly Cohesive Anatomically Shaped Silicone-Filled Implants	LL, LM, LF, LX, ML, MM, MF, MX, FL, FM, FF, FX
Natrelle Biocell Textured Round Silicone-Filled Implants	110, 115, 120
Natrelle Inspira Biocell Textured Responsive Silicone-Filled Implants	TRL, TRLP, TRM, TRF, TRX
Natrelle Inspira Biocell Textured Cohesive Silicone-Filled Implants	TCL, TCLP, TCM, TCF, TCX
Natrelle Biocell Textured Soft Touch Silicone-Filled Implants	TSL, TSLP, TSM, TSF, TSX
Natrelle 133 Tissue Expanders with Suture Tabs	All styles
Natrelle 133 Plus Tissue Expanders	All styles

1. FDA. The FDA requests Allergan voluntarily recall Natrelle BIOCELL textured breast implants and tissue expanders from the market to protect patients: FDA Safety Communication. Updated 6/1/20. Accessed 3/18/22. https://www.fda.gov/medical-devices/safety-communications/fda-requests-allergan-voluntarily-recall-natrelle-biocell-textured-breast-implants-and-tissue#list 2. FDA. Allergan voluntarily recalls BIOCELL textured breast implants and tissue expanders. 7/25/19. Accessed 3/18/22. https://www.fda.gov/safety/recalls-market-withdrawals-safety-alerts/allergan-voluntarily-recalls-biocellr-textured-breast-implants-and-tissue-expanders

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Patient Evaluation

- Evaluate patients for any history of a change in their breasts, **specifically swelling**
- Evaluate any symptoms with physical exam, mammogram, US, MRI as indicated
- If exam and tests are negative, reassure patient that nothing has been found physically or radiologically
  - Offer close follow up, advise patient to return sooner for any change
  - **99.9% chance that patient will NOT develop BIA-ALCL**

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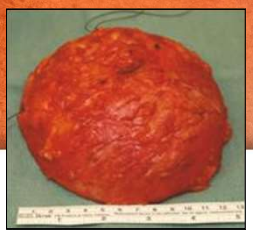
Should Capsulectomy Be Performed If Implant Is Removed?



- **No scientific data to support complete removal of capsules in the absence of malignancy or capsular contracture**
- Capsulectomy carries risk and appropriate informed consent should be obtained
- For patients who elect to undergo textured implant removal with/without replacement because of anxiety related to their textured implant and potential for ALCL development, the **aim is to perform precise complete or partial capsulectomy unless intraoperative findings do not allow safe performance**
- Photograph capsule to document its appearance; send capsule to pathology for microscopic examination
- Any patient with any symptoms (swelling, seroma, mass, rash, etc) should have an appropriate work up with aspiration of fluid, testing for CD30 per NCCN guidelines BEFORE surgery

Photo courtesy of Patricia A. McGuire, MD, FACS

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Risks of Elective Capsulectomy

- Infection
- Hypersensitivity or hyposensitivity of nipple
- Increase in pain, chest wall and breast
- Bleeding
- Pneumothorax
- Hematoma
- Bad reaction to anesthesia
- Ability to breastfeed lost or affected
- Blood clots, pulmonary embolism
- Nerve injury
- Breast asymmetry
- Soft tissue deformities

Photos courtesy of Caroline Glicksman, MD, MSJ

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Realistic Expectations for Textured Implant Patients

- No known risk reduction with implant removal with or without capsulectomy
- Patients will require lifelong surveillance
  - If they develop a seroma, even with a current smooth implant or no implant, they require evaluation for BIA-ALCL
- Cannot screen for ALCL in the absence of symptoms

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Has There Been a "Pure" Smooth Implant Case of ALCL?

- **No**
- All cases with a smooth implant at the time of diagnosis had a **previous history of a textured or mixed implant history**
- For this reason, consider capsulectomy when replacing a textured implant with a smooth implant, if it can be safely performed

Table 4. Smooth Device History (n=9)

Duration of exposure current device (yrs)	Range = 1-16 Median = 3.84 Mean = 5.71	
Previous Device Type	**n**	**%**
Textured Implant only	2	22%
Textured Tissue Expander only	1	11%
Textured Implant and Tissue Expander (texture not reported)	5	56%
Not Reported	1	11%

Table source: personal communication, Colleen M. McCarthy, MD, MS. Data from PROFILE Registry. January 25, 2021.

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Should Capsulectomy Be Performed at the Time of Exchange From Textured Expander to Smooth Implant?

- In the absence of mass in the capsule, or any other abnormality, removal of the capsule is not necessary unless clinically indicated

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ALCL After Implant or Tissue Expander Removal

- There have been **3 reported cases** of ALCL that occurred after removal of an implant without capsulectomy
  - All 3 cases had a history of seroma before or at the time of implant removal
  - These cases are suspected of having undiagnosed/untreated ALCL
- Have there been cases of ALCL from textured tissue expander to smooth implant?
  - There is a case reported, which will be published
  - Not a simple case

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Potential Missteps

- Not testing a seroma
- Proceeding to surgery without imaging
- Not involving lymphoma specialist
- Incomplete resection of posterior capsule
- Leaving behind involved lymph nodes
- Not offering immediate reconstruction

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The Importance of Patient Education

Caroline Glicksman, MD, MSJ

Supporting Women's BIA-ALCL Decision-making

Although clinical guidelines do not recommend explantation,[1]
many women are unsure how to address their BIA-ALCL risk and prophylaxis of the same[2]

Patients

- Weigh BIA-ALCL risk against perceived surgical risks and value of reconstruction[3]
- Can benefit from personalized balance of autonomy and surgeon guidance when selecting a BIA-ALCL prevention plan[3]
- Trust has been strained by BIA-ALCL, but can be restored[2]

Surgeons

- Seek to understand psychosocial factors that may underlie patient perceptions of BIA-ALCL risk[3]
- Individual consults can be therapeutic and help strengthen patient–surgeon relationship[3]
- BIA-ALCL discussions are emotionally charged[2]
- Remain cognizant of group dynamics and that the physician–patient power differential may impact patient decision-making[2]

1. FDA. Questions and answers about breast implant-associated anaplastic large cell lymphoma (BIA-ALCL). 10/23/19. Accessed 3/18/22. https://www.fda.gov/medical-devices/breast-implants/questions-and-answers-about-breast-implant-associated-anaplastic-large-cell-lymphoma-bia-alcl.
2. Park JO et al. *Plast Reconstr Surg Glob Open.* 2020;8(9):e3142. 3. Park JO et al. *Plast Reconstr Surg Glob Open.* 2021;9(10):e3843.

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10/27/21: FDA Issues New Breast Implant Labeling Recommendations to Improve Patient Communication

- Boxed warning
- Patient decision checklist
  - Must be reviewed with prospective patient by healthcare provider to help ensure patient understands risks, benefits, other information about the breast implant device
  - Patient must be given opportunity to initial and sign
  - Must be signed by physician implanting the device
- Updated silicone gel-filled breast implant rupture screening recommendations
- Device description with a list of specific materials in the device
- Patient device card

FDA Breast Implants. 10/27/21. Accessed 3/18/22. https://www.fda.gov/medical-devices/implants-and-prosthetics/breast-implants?utm_campaign=FDA+Strengthens+Safety+Requirements+and+Updates+Study+Results+fo&utm_medium=email&utm_source=govdelivery

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