Are breast implants associated with an increased risk of Breast cancer?

Abstract:

Breast cancer is a global concern that has sparked ongoing research to understand its risk factors and causes. A recent question has emerged regarding the relationship between breast implants and breast cancer risk, particularly in the context of Breast Implant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL). This literature review aims to provide insight into this complex issue, examining existing scientific evidence and exploring potential associations. Three key articles were reviewed, revealing a significant link between breast implants, especially textured ones, and BIA-ALCL. The incidence of BIA-ALCL ranges from 1 in 2,969 women with breast implants to 1 in 355 women with textured implants after breast reconstruction. As this risk grows, the use of textured implants may decline in favour of round and smooth implants, albeit with aesthetic trade-offs. Surgeons must inform patients thoroughly, considering both risks and advantages when choosing implant types. This review underscores the importance of discussing BIA-ALCL risks during informed consent for breast implant surgery and highlights the need for global registries and further research to elucidate predisposing factors and genetic susceptibility. Despite the relatively low risk, it is crucial for all women, with or without breast implants, to continue regular breast cancer screenings and self-examinations, ensuring informed decision-making about their health.

Keywords: Breast Implants, breast cancer, anaplastic large cell lymphoma

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Introduction:

Breast cancer is a pervasive concern for women worldwide, affecting millions of lives and prompting ongoing research to better understand its risk factors and causes. In recent years, one particular question has emerged in the realm of breast health: Does the use of breast implants carry an elevated risk of developing breast cancer? This inquiry has ignited a compelling dialogue within the medical community and among individuals considering breast augmentation or reconstruction surgery. To shed light on this important matter, this investigation delves into the existing body of knowledge, examines potential associations between breast implants and breast cancer, and seeks to provide a balanced perspective on the topic. By exploring the available scientific evidence and scrutinizing various factors at play, we aim to contribute to the informed decision-making process for women considering breast augmentation or reconstruction while fostering a deeper understanding of this intricate relationship between breast implants and breast cancer risk.

Breast implant–associated anaplastic large cell lymphoma (ALCL) is a distinctive type of T-cell lymphoma that arises around breast implants. Although rare, almost all cases with adequate history have involved a textured breast implant. The risk of BIA-ALCL for patients with textured breast implants has been estimated between 1/2832 and 1/30,000 women. Existing studies estimating the numbers exposed and at risk, may have under reported cases, and/or lacked comprehensive follow-up.

Objective: The objective of this literature review is to compare research studies and find out if breast implants are associated with an increased risk of Breast cancer

Methods:

Articles were studied and compared to find out if there exists an association between breast implants and breast cancer. Articles studied were as follows:

Article 1 : Comprised of a retrospective review of documented cases of breast implant–associated ALCL in the United States from 1996 to 2015. The incidence and prevalence in this article were determined based on a literature and institutional database review of breast implant–associated ALCL cases and textured breast implant sales figures from implant manufacturers' annualized data. [1]
Article 2 : A prospective cohort study which was conducted in patients who underwent breast reconstruction by a single surgeon at Memorial Sloan Kettering Cancer Center (MSKCC) from December 1992 to December 2017. Major events related to implants were prospectively recorded. Cases of BIA-ALCL were identified by cross-checking clinical, pathology and external records data. Patients were followed until lymphoma occurrence or last follow-up. The primary outcomes were incidence rate per person-years and cumulative incidence. [2]

Article 3: The 3rd article studied in our literature review was anarticle in which search was performed from January 2019 to late 2021 using the PubMed database. Fourteen articles were included in the qualitative evaluation of international data. Latest reports regarding the total number of BIA-ALCL cases and number of deaths were identified.[3]

Results:

Results found in article 1:

One hundred pathologically confirmed breast implant–associated ALCL cases were identified in the United States. Mean age at diagnosis was 53.2 ± 12.3 years. Mean interval from implant placement to diagnosis was 10.7 ± 4.6 years. Forty-nine patients had breast implants placed for cosmetic reasons, 44 for mastectomy reconstruction, and seven for unknown reasons. Assuming that breast implant–associated ALCL occurs only in textured breast implants, the incidence rate is 2.03 per 1 million person-years (203 per 100 million person-years), which is 67.6 times higher than that of primary ALCL of the breast in the general population (three per 100 million per year; $p < 0.001$). Lifetime prevalence was 33 per 1 million persons with textured breast implants.[1]

Results found in article 2:

From 1992 to 2017, 3546 patients underwent 6023 breast reconstructions, mainly after breast cancer removal, or contralateral prophylactic mastectomy, using macro-textured surface expanders and implants. All reconstructions were performed by a single surgeon (PGC). Median follow-up was 8.1 years (range, 3 months – 30.9 years). Ten women, 1/354, developed ALCL after a median exposure of 11.5 years (range, 7.4–15.8 years). Overall risk of BIA-ALCL in our cohort is 1/355 women or 0.311 cases per 1000 person-years (95% CI 0.118 to 0.503).[2]

Results found in article 3:

Estimates of the risk and incidence have increased significantly recently, affecting 1 in every 2,969 women with breast implants and 1 in 355 patients with textured implants after breast reconstruction. The average exposure time to diagnosis was 8 (range: 0–34) years. Approximately 80% of BIA-ALCL cases were diagnosed at IA–IIA stages, for which the treatment was breast implant

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removal, full capsulectomy, and excision of all suspected lymph nodes. Globally, at least 949 cases were reported as of 2021 .[3]

Discussion:

As of late 2022, the American Society of Plastic Surgeons has accumulated 1,333 cases of BIA-ALCL worldwide and 35 associated deaths. The total included 402 cases and eight deaths in the U.S. [4]

The incidence of BIA-ALCL ranges from 1 in 2,969 women with breast implants to 1 in 355 women with textured implants after breast reconstruction indicating a higher association with textured implants. The absolute risk of developing BIA-ALCL in women with BRCA 1/2 mutation was 1/1,551 at age 75 years, compared with 1/7,507 in women from the general population. [3]

As the incidence of BIA-ALCL increases, we can expect an increasing reluctance in using textured implants in breast reconstructions, in favor of round and smooth implants, at the expense of a less natural appearance of the reconstructed breast. Surgeons should fully inform their patients regarding the potential risks and advantages of each implant type and obtain their consent to receive the most appropriate alternative.

The most widespread and accepted hypothesis for the mechanism of ALCL is that textured implants, with their greater surface areas and increased bacterial adhesion, lead to higher rates of biofilm formation and subsequent lymphocyte activation.

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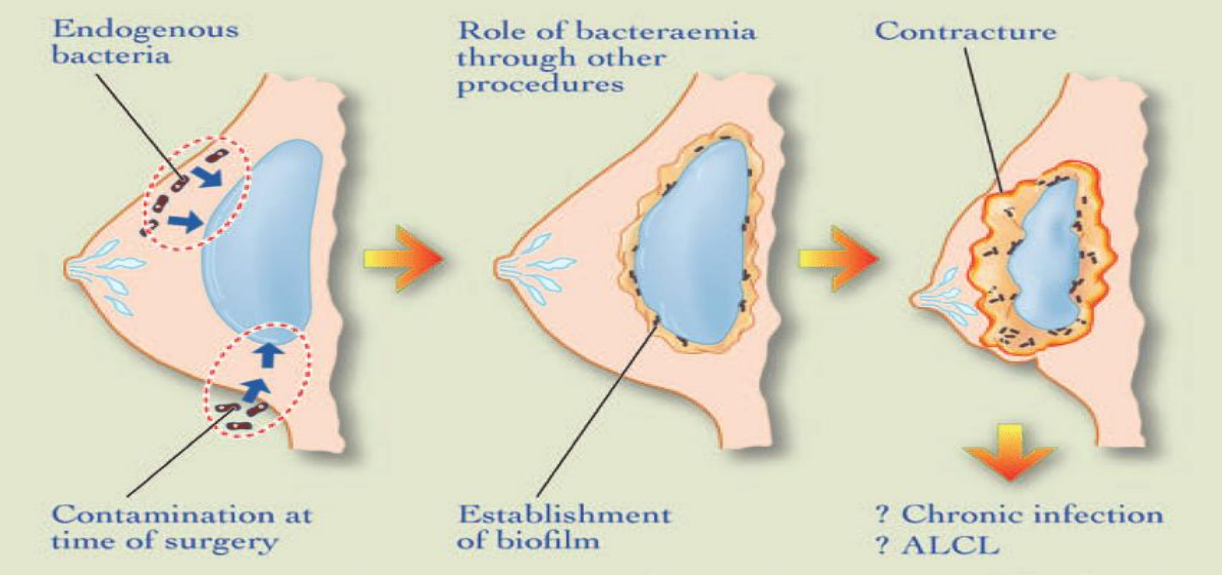

Figure 1: Hypothesized mechanism of formation of ACLC due to breast implant [5]

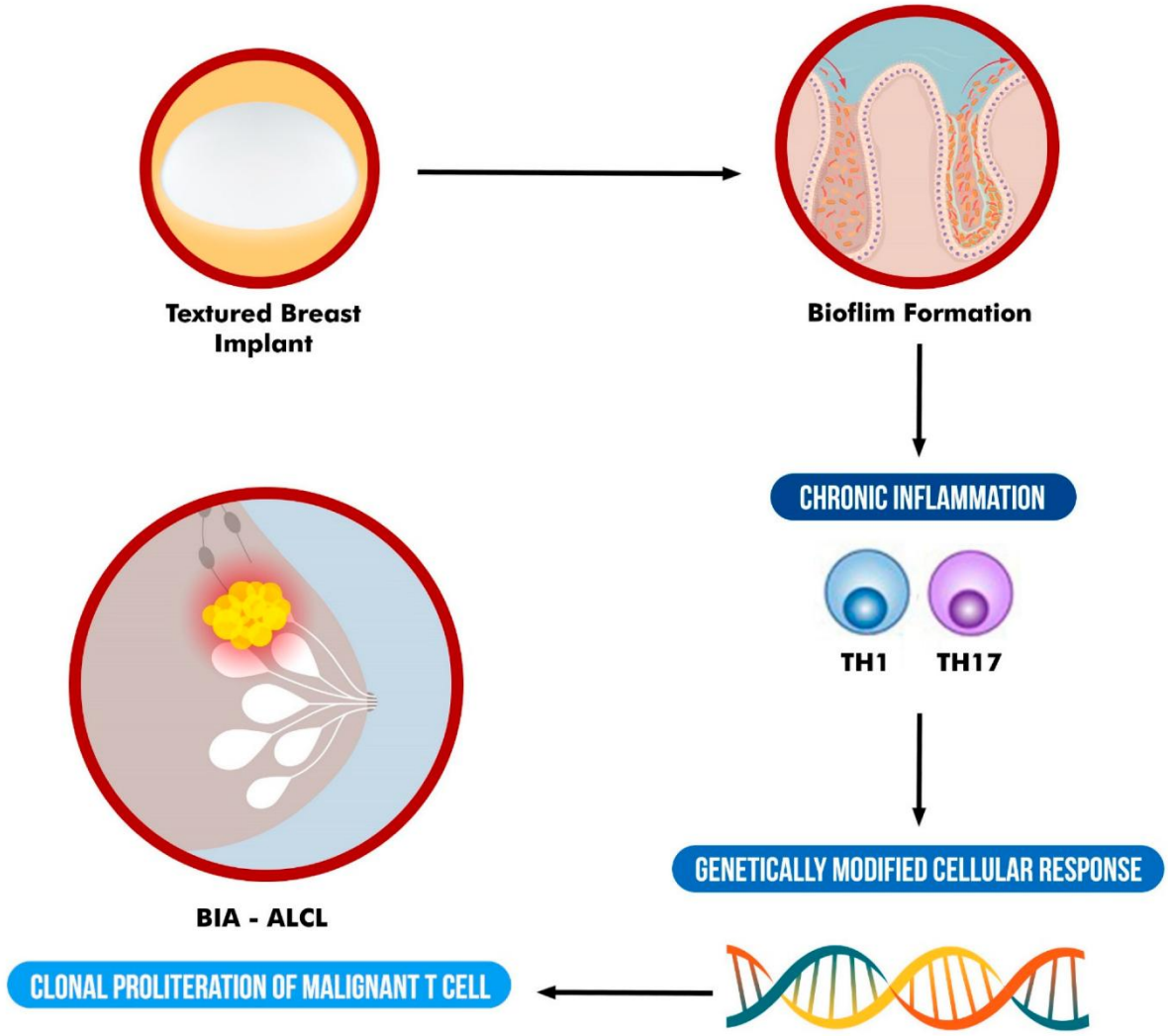

Figure 2: Flowchart Illustration of ALCL formation from textured breast implant.[6]

Conclusion:

This literature review demonstrates a statistically significant association between breast implants and breast implant-associated ALCL with the association being comparatively higher for textured breast implants. Although women with a breast implant have a low risk of developing breast implant–associated ALCL, the current U.S. incidence is significantly higher than that of primary ALCL of the breast in the general population.

It is important to note that regular breast cancer screenings and self-examinations remain essential for all women, regardless of whether they have breast implants. Furthermore, the decision to undergo breast augmentation or reconstruction should be made carefully, considering both potential risks and benefits. Additional research and long-term follow-up studies are needed to further elucidate the relationship between breast implants and breast cancer risk, ensuring that patients can make well-informed decisions about their health and well-being.

A discussion of the risk of BI-ALCL should be a standard part of the informed consent process prior to placement of a breast implant. Furthermore, improved global BI-ALCL registry mechanisms and centralized tissue banking are needed to elucidate predisposing factors and genetic susceptibility to this rare condition. Future studies are required to determine if geographic, genetic, or surgical technique variability affects risk.

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