



## Common and Less-Common Complications Associated with Breast Implants

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### Keywords

Breast implants; Breast augmentation; Capsular contracture; BIA-ALCL

### Short Communication

Breast augmentation is one of the most common forms of cosmetic surgery in the United States with approximately 300,000 women undergoing the procedure in 2016 [1]. Annually, another 100,000 women with breast cancer will undergo reconstruction using implants as well [1]. Breast implant devices have been carefully studied to determine their safety and numerous changes over many years have helped to improve the durability of these devices. Nonetheless, breast implants are still associated with both short and long-term complications that can be common or infrequent. Patient risk factors will impact the frequency of observed complications and type of device can also influence complications.

Common complications such as infection, breast pain, numbness, contracture of the capsule, and cosmetic deformity can occur in over 20% of patients at some point [2]. Rates of implant rupture or leakage have decreased as implant manufacturing has improved over several decades [3]. Similarly, improvement in imaging techniques with mammography have allowed for enhanced cancer detection rates in the setting of breast implants [4]. One late but very rare complication associated with breast implants has been recently elucidated and described as Breast Implant Associated-Anaplastic Large Cell Lymphoma (BIA-ALCL) [5]. This overview will focus on the incidence, risk factors, and management of early and late complications associated with breast implants.

### Early Complications

Complications associated with breast implants that occur shortly after surgery within the first 30 days are considered early complications and include hematoma, infection, skin or nipple-necrosis, seroma, and pain. These complications are infrequent in the setting of cosmetic breast augmentation; however they are seen in 3%-10% of patients undergoing implant-based breast reconstruction after mastectomy [6]. Patient risk factors associated with these complications include smoking, obesity, diabetes, and prior chest-wall radiation [7,8]. To minimize these early complications, careful surgical technique to achieve hemostasis, minimize pocket size, and reduce skin necrosis is necessary [2]. Preoperative antibiotics and antibiotic irrigation of the implant cavity have also demonstrated improved outcomes [6,9,10]. Management of early complications can be as simple as oral antibiotics for minor infections and seroma-drainage in the office for simple fluid collections, or as severe as operative drainage of hematomas, debridement of necrotic tissue, and removal or loss of implant.

### Late Complications

Long-term complications associated with breast implants can be seen months to even decades after implant placement. These complications include capsular contracture, implant rupture, chronic seroma, and BIA-ALCL. Capsular contracture is believed to be due to an immune response that creates collagen formation around the implant leading to distortion of both the implant and breast. Capsular contracture is graded by severity with a Baker grade I describing a breast that is soft and normal in appearance whereas Baker grade III and IV describe obvious deformity, firm to hard breast, and pain. Baker grade III/IV capsular contracture can be seen in 10% - 25% of women with implants [3,8]. Contracture rates can be reduced with minimizing handling of the implant, avoiding exposure of the implant to chest skin, antimicrobial irrigation of the cavity prior to implant placement, placement of the implant behind the pectoralis muscle rather than subglandular, and

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use of a saline versus a silicone implant [2,3,9,10]. Management of capsular contracture has been studied extensively. Capsulotomy can be effective; however rupture of the implant is a risk [11]. Implant and capsule removal can be effective, however recurrent contracture is not infrequent when a new implant is placed [2].

Implant rupture was much more common with earlier forms of silicone implants and until safety was established by the Food and Drug Administration (FDA) in 2006, use of silicone implants was banned for an almost 10-year period [3]. Once safety and efficacy data was established, silicone implants have evolved in terms of outer shell and inner gel material from first generation implants in the 1960s now to third, fourth, and fifth generation implants with each version offering improvements in either aesthetics, rupture rate, or capsular contracture rate. Since many implant ruptures can be subclinical, actual reported rates of rupture vary widely from less than 1% in newer generation implants inserted for augmentation, to over 35% with older models followed for over a ten year period [3,12]. Since rupture rate tends to increase with time, long-term follow-up with Magnetic Resonance Imaging (MRI) evaluation is necessary to establish incidence of rupture [3,12].

Once rupture is confirmed, management will depend on patient symptoms as not all ruptured implants need to be removed. If there is an obvious cosmetic deformity or pain associated with the rupture, then removal and exchange of the implant is a likely course of action. On the other hand, subclinical, contained ruptures, especially with newer generation silicone gel that does not leak or extravasate into surrounding tissue, can be managed expectantly.

A rare but concerning risk of breast implants that has been given more recent attention is known as Breast Implant Associated-Anaplastic Large Cell Lymphoma (BIA-ALCL). This is a rare condition thought to occur with 1 in 500,000 to 1 in 10,000 implants [5]. BIA-ALCL is a sub-type of T-cell lymphoma first described in 1997 and recognized by the FDA as a risk associated with breast implants in 2011. Clinical presentation often occurs ten or more years after implant placement and patients often present with a chronic seroma, but there can also be a mass associated with the implant capsule. Textured implants, rather than smooth implants, have been more frequently associated with BIA-ALCL. The course of BIA-ALCL is typically indolent, with excellent outcome with removal of the implant and capsule alone, however a more infiltrative, aggressive variant of BIA-ALCL has been described in which case systemic disease can be present requiring more aggressive treatment with often worse outcome [13,14].

## Cancer Detection

It has been recognized that the presence of breast implants can significantly lower the sensitivity of screening mammography in the detection of breast cancer [15]. A number of studies have evaluated the impact of this lower sensitivity and have found no difference in tumor stage or presenting characteristics in women with breast cancer with implants compared to those without implants [15,16]. More recent studies using Computer-Aided Detection (CAD) with digital mammography show improved cancer detection with this modality in women with breast implants [4]. Tomosynthesis, or 3D-mammography, has also improved the sensitivity of cancer detection in all women [17,18]. While sensitivity of mammography is decreased in women with breast implants, clinical exam and symptoms are more likely to identify cancer in patients with implants

compared to those without implants.

## Conclusion

Breast implants, whether used for cosmetic procedures or reconstructive procedures are widely used. Over decades of scrutiny and manufacturing improvements, they are thought to be safe with an acceptable risk profile. Implant type, patient risk factors, and surgical technique all influence the frequency of complications. Breast infection, capsular contracture, and implant rupture can often be managed conservatively; however implant replacement may be necessary. BIA-ALCL is rare but can usually be managed with removal of implant and capsule once diagnosed. Improvements in mammography have made cancer detection in women with breast implants more feasible.

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