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Case Study

Breast cancer and a view of treatment-associated ailments and disease

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Key Learning Points

This case report discusses treatment-associated morbidity in relation to breast cancer, and how such secondary maladies, alongside the function of the treatment, influence its perceived merit.

Breast cancer represents the most common type of cancer in the UK, affecting approximately 1 in 8 women during their lifetime, with radiotherapy exposing the chest area increasing this risk. Here, we are presented with a woman with breast cancer following previous total body irradiation in her youth, who, when considering her reconstructive options alongside a double mastectomy, opted against implants due to potential down the line complications. Breast implants, a treatment approach that on the surface seemingly fulfils a purely aesthetic function, are juxtaposed with radiotherapy, a treatment necessary for survival following a cancer diagnosis.

There are some pivotal learning points to be considered. It is highlighted that treatments which are not obviously 'lifesaving' can often seem questionable in their value, but the importance of looking beyond the obvious physical benefits of treatment is emphasised. For one, 'health' is not limited to normal physiological function, but of equal importance is psychological and psychosocial wellbeing; medical and surgical interventions must equivalently be concerned with these aspects of health in order to provide optimal outcomes and holistic care. Another point is that societal constructs and expectations can have a significant impact on the decision-making process of patients, and how they perceive the benefits of a treatment approach - in this instance breast implants.

Overall, this case report accentuates the kaleidoscopic nature of managing breast cancer treatment. The societal and thus often personal perception of breasts as a paramount symbol of feminine beauty, and the role they play in womanhood, means that consideration of aesthetic outcomes is of comparable significance in surviving the cancer as getting rid of the cancer itself.

Case presentation

EWD is a 50-year-old female who owns a specialist ladies shoe shop. She presented with a malignant lump in the upper outer quadrant of her left breast at the Great Western Hospital, later histologically diagnosed as a grade 3 invasive ductal carcinoma, with immunohistochemistry showing the invasive tumour was oestrogen-receptor-positive.

EWD has a personal history of total body irradiation she underwent for treatment of acute lymphatic leukaemia, diagnosed when she was 19 years old in October 1988; the irradiation was subsequent to several rounds of neoadjuvant chemotherapy and a bone marrow transplant in April 1989. The aforementioned malignant breast tumour was officially diagnosed thirty years later, on the 22nd of July 2019. The patient also has a family history of malignant breast neoplasms, as well as ischaemic heart disease and other diseases of the circulatory system. EWD also has unspecified neuralgia and neuritis at multiple sites for which she takes amitriptyline, ankle and foot joint effusion, and was told she is pre-diabetic on post-chemotherapy bloods.

Initially, EWD received neoadjuvant EC chemotherapy starting on the 1st of August 2019, of which she only had three of four cycles due to severe nausea alongside an allergy to metoclopramide, and ulceration of the mouth and digestive tract; the tumour had reduced considerably after three rounds. This was followed by twelve weekly doses of paclitaxel. Due to the position of the tumour sitting close to her chest wall at 6 o'clock and her family history of malignant breast neoplasms, it was decided there was not enough clearance for a wide

local excision, so she was scheduled to have a bilateral mastectomy (the right breast mastectomy was done as a prophylactic measure) and sentinel lymph node biopsy. She was referred to the John Radcliffe plastics outpatient's department to discuss her reconstructive options, where she opted for an immediate latissimus dorsi flap breast reconstruction (a DIEP flap was not feasible as she did not have sufficient abdominal fat). There was a possibility she would have to undergo post-operative radiotherapy should there be disease in her lymph nodes, but there was reluctance to do this due to her history of eight hours of irradiation and risks associated with the close proximity of the tumour to her heart.

On the morning of the operation, the patient was consented and a miscommunication in the proposed surgery was rectified – EWD had told her breast surgeon at the Great Western Hospital that she did not want implants as part of her breast reconstruction, but this was not effectively conveyed to the plastic surgeon at the John Radcliffe, who had recorded the patient to have opted for a latissimus dorsi reconstruction with breast implants. During the process of consent EWD corrected this error. EWD said she did not want a "foreign body" to be inserted, and also mentioned a rare cancer she had heard is associated with implants and noted the risk of radiotherapy distorting their shape. Her bra size was 36B, and since she was happy with her reconstruction being smaller than her original breast size, implants were excluded. At this time, the tumour in her breast was not clinically palpable and there were no overlying skin changes.

The patient successfully underwent bilateral mastectomy with immediate latissimus dorsi flap breast reconstruction on the 15th of January 2020 and was discharged on the 23rd of January 2020, eight days after admission and problems with controlling postoperative pain. Post-surgical histology showed no evidence of tumour or residue in breast or lymphatic tissue.

Introduction

Invasive ductal carcinoma (IDC), also known as infiltrating ductal carcinoma, is the most

common type of breast cancer, with 80% of all breast cancers being IDCs[1]. IDCs are cancers that originate in a milk duct and have invaded the fibrous or fatty tissue of the breast outside of the duct[2]. Surgery to remove the cancer is usually the first-line treatment and can be breast-conserving or a complete mastectomy, and patients who undergo mastectomies are offered breast reconstruction, subclassified as tissue-based reconstruction, breast implants, or both.

EWD was diagnosed with an IDC, which she described as being secondary to total body irradiation (TBI). Radiation therapy is long known to potentially cause cancer down the line[3]; since children and young adults are likely to survive for a longer duration following cancer therapy, they are at a greater risk of developing radiation-induced second malignancies[4]. Of course, in situations such as this the possibility of a secondary cancer is outweighed by the improved survival, prevention or delaying of relapses, and improvement in quality of life compared to not administering radiation – "the biggest risk to patients with cancer is the cancer that they are battling"[5].

However, consider breast implants, a reconstructive approach used following breast malignancies that may potentially compromise wellbeing and survival, and could be said to serve a purely aesthetic function – why do we offer such a treatment? Here, I will examine the link between radiotherapy and breast cancer, before focusing on the complications associated with implant-based reconstructions and consider why, despite their risks and non-physiological function, they are still an important part of treatment for breast cancer.

Radiotherapy and breast cancer – when a disease is caused by the cure

TBI is a type of radiotherapy given prior to a bone marrow transplant as part of the treatment ("conditioning") with chemotherapy, reducing the risk of transplant rejection, destroying any residual cancer cells, and allowing bone marrow cells to seed and grow[6]. Studies have found an increased risk of breast cancer among survivors of allogeneic haematopoietic cell transplantation[7], with a higher 25-year cumulative incidence among survivors who received TBI than those who did not[8]. Furthermore, other research has similarly demonstrated a moderate increase in the overall risk for breast cancer, with 52 women developing breast cancer at a median of 12.5 years after transplantation, 47 of these having received TBI; risk was concentrated in younger patients (those treated in their teens and twenties)[9]. This demonstrated similarities between the risks of TBI and another form of radiotherapy with a much more established link to breast cancer: mantle field radiation (MFR).

MFR focuses the treatment beam into the mediastinum of the patient through the anterior chest wall, exposing chest wall structures, particularly the breast, to so-called in-field scatter radiation[10]. The incidence of breast cancer in patients treated with mantle radiation is known to be elevated[11]; women treated with MFR have up to a 20-fold increase in breast cancer risk compared to the general population, and up to 48% cumulative risk after 40 years of follow-up[12,13]. The greatest relative risk is observed in women under 20 years of age at the time of irradiation, but women older than 20 years still have a 50% higher-than-baseline risk for subsequent breast cancer development[13]. The risk of breast cancer after chest radiotherapy is comparable to that of BRCA mutation carriers[14].

This evidence strongly supports the importance of systematic screening for breast cancer in women with increased risk. Results from the largest English Cancer Network of a national notification risk assessment and screening programme, implemented in the UK in 2003 for women treated with supradiaphragmatic radiotherapy, found that 23 of 243 women (5.5%) attending clinical review were diagnosed with breast cancer, reflecting a standardised incidence ratio of 2.9 compared with an age-matched general population[15]. Furthermore, the mean latency for breast cancer was significantly longer than the mean follow-up duration for those unaffected, suggesting they still remain at high risk, with risk dramatically increasing more than 15 years after therapy[15,16]. Though more research needs to be done in this area, if the dose and risk to the breast of TBI are shown to be comparable to MFR, TBI patients are likely to similarly benefit from follow-up breast screening. As noted, the immediate need to treat the primary cancer decidedly outweighs the secondary risks of treatment - but not all treatments can claim such unequivocal virtue.

Look good feel good – are the benefits of breast implants worth the risk?

A national audit in 2011 showed that 90% of women having immediate breast reconstruction were satisfied with how they looked in a mirror clothed, versus 82% for women having mastectomy only and 93% for

women having delayed breast reconstruction; these figures fell considerably when unclothed[17]. Unlike the curative nature of radiotherapy, breast implants are a prosthesis used to change the size, shape, and fullness of a person's breast, often used for reconstructive purposes to restore shape following mastectomy for breast cancer. There are two basic types of implants, saline and silicone gel-filled, which can be textured or smooth. Autologous reconstruction such as fat grafting and microsurgical free flaps are an alternative for patients not wishing to use "foreign material" like an implant. However, in some patients this may not be feasible: there may be insufficient tissue available for reconstruction purposes, or an implant may be needed to add sufficient bulk to achieve the desired breast size. Whatever the reason, there are many cases in which patients will opt for breast implants – however, the many risks associated with implants, and their purely aesthetic nature, may make questionable their efficacy. Further to general surgical risks, there are many specific to implants such as implant leakage or rupture, and scar tissue formation around the implant (capsular contracture) can lead to pain and distortion of the implant, as well as the possibility of revision surgery. In fact, due to the inevitably of capsular contracture, it is almost inevitable that implants will eventually require replacement, and reports by the Food and Drug Administration indicate that within 10 years of the original surgery, 20% of women will have their implants repaired or replaced[18].

In addition, breast implants have been implicated with a condition labelled as breast implant illness (BII), a non-official medical diagnosis describing women with breast implants that self-identify and describe a variety of symptoms including (but not limited to) fatigue, chest pain, hair loss, headaches, chills, photosensitivity, chronic pain, rash, body odour, anxiety, brain fog, sleep disturbance, depression, neurologic issues, and hormonal issues they believe are directly connected to their implants[19]. These symptoms may occur at any time following implant surgery, immediately or years later; in many cases, removal of the implants and surrounding capsules, without replacement, improves or completely resolves symptoms[20]. A preliminary study of 100 patients with self-reported BII demonstrated that in 89% of these patients, implant removal and capsulectomy led to improvement in some symptoms within 3 months of surgery[20]. Similarly, another Netherland-based study found that 69% of 80 women experienced an improvement in symptoms following implant removal[21]. However, these studies are severely limited by their small cohort numbers. Overall, there is a lack of research on outcomes following implant removal surgery for BII, with no way to verify that symptom alleviation does not result from other factors. The recent rapid increase in patients reporting BII is thought to be related to social media patient support groups and media coverage raising awareness of this condition[22]. Clearly, there is a need to better understand this group of systemic symptoms named BII, and aptly the American Society of Plastic Surgeons and the Aesthetic Surgery Education and Research Foundation are developing and funding new research on this poorly understood and little-studied condition.

Many symptoms of BII are associated with autoimmune and connective tissue disorders such as lupus, rheumatoid arthritis, and scleroderma. Although no definite or causative link has been established, recent studies suggest that silicone gel-filled breast implants are associated with a slightly higher risk of developing an autoimmune or connective tissue disease. In one study of 99,993 patients, silicone implants were associated with higher rates of rare harms such as Sjögren's syndrome, scleroderma, rheumatoid arthritis, stillbirth, and melanoma, with the risk of developing these conditions approximately six to eight times higher than the general population[23]. However, the absolute rates of these outcomes were low, and limitations include that some disease was self-reported by patients and not physician-diagnosed, with a significant number of patients dropping out before the end of the study. Another team of researchers examined the electronic health records of 123,255 Israeli women and found that silicone gel-filled implants were associated with a significantly higher likelihood of being diagnosed with autoimmune or rheumatic disorders, such as Sjögren's syndrome, systemic sclerosis, and sarcoidosis relative to women without breast implants who were of a similar age and socioeconomic status[24].

Even more startling perhaps is evidence that breast implants, an element of breast cancer treatment, are themselves associated with cancer. Recently, textured breast implants specifically have been associated with the rare cancer anaplastic large cell lymphoma (BIA-ALCL), a type of non-Hodgkin's lymphoma[25]. In 2016, the World Health Organisation designated BIA-ALCL as a T-cell lymphoma that can develop following breast implants, but due to significant limitations in worldwide reporting and lack of global breast implant sales data, the exact number of cases remained difficult to determine[26]. The cause is not fully understood, but it is postulated that chronic inflammation via bacterial infection in the area surrounding the implant may be involved, with the crevassed surface and higher surface area of textured implants increasing this risk[27]. In the case studies reported, BIA-ALCL is usually contained in the fibrous scar capsule and fluid near the implant, not in the breast tissue itself, but in some cases may spread throughout the body[28]. The risk of developing BIA-ALCL with textured breast implants is considered low, estimated between 1/2831 and 1/30,000 women[29]. However, one prospective cohort study recorded major events related to implants and found that overall risk of BIA-ALCL in this cohort was 1/355 women or 0.311 cases per 1000-person years, suggesting a significantly higher incidence rate than previously reported[29]. While the vast majority of cases occur in patients with textured implants, some cases have been reported in patients with smooth implants[30]. Furthermore, specific models are associated with a much higher risk of BIA-ALCL; according to one study, Silimed polyurethane textured implants pose a 23.4-times higher risk of ALCL, and Allergan BIOCELL implants a 16.5-times higher risk, compared with lower surface area SILTEX implants[31]. In fact, in July 2019, Allergan ordered the recall of its BIOCELL textured implants after a series of reports by the FDA, which suggested the implants were causing cancer in hundreds of patients worldwide[32]. Such emerging evidence is essential to help patients make informed choices about implants when undergoing breast reconstruction.

So, when breast implants carry all these risks to serve a purely aesthetic function, why do we still use them? The breast plays a role in puberty, motherhood, sex, health and ageing, and breast cancer surgery involving mastectomies and implants can differentially compromise and augment these roles. For women having a mastectomy, the procedure itself is a compromise, as they no longer have full sensation in their breast, nor are they able to breastfeed. Moreover, society seems to have an obsession with the female body, with women's breasts seen as an integral part of their identity and femininity[33]. Psychological

distress in women coping with breast cancer results from many obvious and tangible factors, including facing a life-threating illness, painful and impairing treatments, and significant role changes[34]. However, many women with breast cancer also face psychological distress related to body image concerns, and thus fear the prospect of surgery for breast cancer[34].

Evidence substantiates the positive impact breast implant surgery has on women, improving psychosocial and sexual well-being and self-esteem, decreasing depressive symptoms, and alleviating eating disorders[35]. On the whole, it seems that women have a better quality of life derived from changes in their sexuality, satisfaction with their body image, and personal wellbeing[36]. This makes sense, since women are socialised to perceive their personal value as a reflection of their outward appearance, more so than men, and it could be said that the image of female breasts are presented as the "ultimate commodity" in our current consumer society[33]. The breast even has an "aesthetic ideal", with the following features identified: the proportion of the upper to the lower pole being a 45:55 ratio, the angulation of the nipple being upwards at a mean angle of 20º from the nipple meridian, the upper pole slope being linear or slightly concave, and the lower pole convex[37]; reconstruction aims to achieve these "ideals". This societal construct, which not only defines the breast as a symbol of feminine beauty but also delineates the exact anatomical dimensions by which such femininity be achieved, no doubt contributes to the increased quality of life women perceive following implant surgery, whether that be after mastectomy or for augmentation purposes. Therefore, although an individual choice, it must be acknowledged that this society-defined body image of what it means to be womanly affects how women perceive their own self-worth, and their decision to undergo implant surgery. Nevertheless, breast implants have their merits, and psychological and psychosocial manifestations of a disease and its treatment are important considerations to ensure the holistic wellbeing of women following such a life-altering event as breast cancer. The importance of implants in breast reconstruction therefore cannot be dismissed.

Conclusion

It is evident that for some treatments, such as irradiation, the imminent need to treat the primary cancer undeniably takes precedence over the downstream risks. However, in the case of breast implants, their value may seem more contentious. There are very few surgical procedures that have a history both as fascinating and terrifying as those involving the breast. A passing comment made by the consultant plastic surgeon operating on EWD struck me: he said we may one day think of implants like we now think of injecting paraffin into the breasts for enlargement - crazy and unimaginable. However, all medical and surgical interventions carry their own risks, and with breast implants the benefits and complications are multi-faceted, comprising both physical and psychological health, with their aesthetic function important in the wellbeing and quality of life of women who undergo mastectomy. The cultural view of breasts as a symbol of femininity, beauty, and sexual attractiveness is no doubt a key contributor to this issue of wellbeing. Although breast implants do have their downfalls, aesthetic outcome is not just some shallow concern of women undergoing breast surgery but is associated with significant psychological and psychosocial morbidity. EWD told me that, after everything she has been through, she would rather have small breasts than take the risk of developing possible complications down the line – this was the choice she made with the information she was given. And this is key, whether or not the risks are worth taking is the decision of the individual women, and the job of the medical professional is to give her the understanding that allows her to make that choice optimally

Conflicts of interest

None.

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Consent

The patient has consented to the publication of this case study.

References

1. Breastcancer.org [Internet]. Pennsylvania: Breastcancer.org; [updated 2019 March 09; cited 2020 February 6]. Available from: https://www.breastcancer.org/symptoms/types/idc.
2. Hopkinsmedicine.org [Internet]. Maryland: John Hopkins Medicine; [updated –; cited 2020 February 6]. Available from: https://www.hopkinsmedicine.org/breast_center/breast_cancers_other_conditions/invasive_ductal_carcinoma.html.
3. Ng J, Shuryak I. Minimizing second cancer risk following radiotherapy: current perspectives. Cancer Manag Res. 2014 Dec 17;7:1-11.
4. Dracham CB, Shankar A, Madan R. Radiation induced secondary malignancies: a review article. Radiat Oncol J. 2018 June 29; 36(2):85-94.
5. NCCN Foundation [Internet]. Pennsylvania: National Comprehensive Cancer Network; [updated -; cited 2020 February 10]. Available from: https://www.nccn.org/patients/resources/life_after_cancer/understanding.aspx.
6. The Radiotherapy Department [Internet]. Oxford: Oxford University Hospitals; [updated 2015 March; cited 2020 March 15]. Available from: https://www.ouh.nhs.uk/patient-guide/leaflets/files/4524Pirradiation.pdf.
7. Baker K.S. et al. Total Body Irradiation Dose and Risk of Subsequent Neoplasms Following Allogeneic Hematopoietic Cell Transplantation. Blood. 2019 Jun 27;133(26);2790-2799.
8. Friedman D.L. et al. Increased Risk of Breast Cancer Among Survivors of Allogeneic Hematopoietic Cell Transplantation: A Report From the FHCRC and the EBMT-Late Effect Working Party. Blood. 2008 Jan 15;111(2):939-44.
9. Muscat J, Rubin G. PB.17. Are patients who have had total body irradiation at similar risk of breast cancer to those having mantle radiotherapy? A review of the evidence and suggestions on breast imaging surveillance. Breast Cancer Res [Internet]. 2014 Nov 3;16(1):45. Available from: doi: 10.1186/bcr3736.
10. Allen S.D., Wallis M.G., Cooke R, Swerdlow A.J. Radiologic Features of Breast Cancer after Mantle Radiation Therapy for Hodgkin Disease: A Study of 230 Cases. RSNA [Internet]. 2014 Mar 25;272(1). Available from: https://doi.org/10.1148/radiol.14131789.
11. Freniere B. et al. Outcomes Following Breast Reconstruction in Patients With Prior Mantle Radiation for Treatment of Hodgkin's Lymphoma. Ann Plast Surg. 2020

May;84(5):507-511.
12. Aisenberg A.C. et al. High risk of breast carcinoma after irradiation of young women with Hodgkin's disease. Cancer. 1997 Mar 15;79(6):1203-10.
13. Janjan N.A., Zellmer D.L. Calculated risk of breast cancer following mantle irradiation determined by measured dose. Cancer Detect Prev. 1992;16(5-6):273-82.
14. Swerdlow A.J. et al. Breast cancer risk after supradiaphragmatic radiotherapy for Hodgkin's lymphoma in England and Wales: A National Cohort Study. J Clin Oncol. 2020 Aug 1;30(22):2745-52.
15. Howell S.J. et al. The UK national breast cancer screening programme for survivors of Hodgkin lymphoma detects breast cancer at an early stage. Br J Cancer. 2009 Aug 18;101(4):582-588.
16. Hancock S.L., Tucker M.A., Hoppe R.T. Breast Cancer After Treatment of Hodgkin's Disease. J Natl Cancer Inst. 1993 Jan 6;85(1):25-31.
17. National Mastectomy and Breast Reconstruction Audit [Internet]. UK: The Royal College of Surgeons of England; [published 2011; cited 2020 June 6]. Available from: https://www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/mastectomy-breast-4/.
18. FDA Update on the Safety of Silicone Gel-Filled Breast Implants [Internet]. USA: Center for Devices and Radiological Health U.S. Food and Drug Administration; [published 2011 June; cited 2020 February 10]. Available from: https://www.fda.gov/media/80685/download.
19. Surgery.org [Internet]. California: The Aesthetic Society; [cited 2020 February 10]. Available from: https://www.surgery.org/sites/default/files/downloads/BII-Talking-Points-FINAL-1.15.19.pdf.
20. Breastcancer.org [Internet]. Pennsylvania: breastcancer.org; [updated 2020 February 5; cited 2020 February 13]. Available from: https://www.breastcancer.org/treatment/surgery/reconstruction/types/implants/special-report/breast-implant-illness.
21. Maijers M.C. et al. Women with silicone breast implants and unexplained systemic symptoms: a descriptive cohort study. Neth J Med. 2013 December;71(10):534-40.
22. Lachmansingh D.A. Breast implant illness and psychiatric implications. Cambridge University Press [Internet]. 2019 Nov 4. Available from: https://doi.org/10.1017/ipm.2019.48.
23. Coroneos C.J., Selber J.C., Offodile A.C., Butler C.E., Clemens M.W. US FDA Breast Implant Postapproval Studies: Long-term Outcomes in 99,993 Patients. Ann Surg. 2019 Jan;269(1):30-36.
24. Watad A et al. Silicone breast implants and the risk of autoimmune/rheumatic disorders: a real-world analysis. Int J Epidemiol. 2018 Dec 1; 47(6):1846-1854.
25. Cordeiro P.G. et al. Risk of breast implant associated anaplastic large cell lymphoma (BIA-ALCL) in a cohort of 3546 women prospectively followed long term after reconstruction with textured breast implants. Plast Reconstr Aesthet Surg. 2020 May;73(5):841-846.
26. Srinivasa D.R. et al. Global Adverse Event Reports of Breast Implant-Associated ALCL: An International Review of 40 Government Authority Databases. Plast Reconstr Surg. 2017 May;139(5):1029-1039.
27. Kadin M.E. et al. Biomarkers Provide Clues to Early Events in the Pathogenesis of Breast Implant-Associated Anaplastic Large Cell Lymphoma. Aesthet Surg J. 2016 Jul;36(7):773-81.
28. Thompson P.A., Lade S., Webster H., Ryan G., Prince H.M. Effusion-Associated Anaplastic Large Cell Lymphoma Of The Breast: Time For It To Be Defined As A Distinct Clinico-Pathological Entity. Haematologica. 2010 Nov;95(11):1977-1979.
29. Cordeiro P.G. et al. Risk of Breast Implant Associated Anaplastic Large Cell Lymphoma (BIA-ALCL) in a Cohort of 3546 Women Prospectively Followed Long Term After Reconstruction With Textured Breast Implants. J Plast Reconstr Aesthet Surg. 2020 May;73(5):841-846.
30. Fda.gov [Internet]. USA: The Food and Drug Administration; [updated 2019 July 24; cited 2020 February 13]. Available from: https://www.fda.gov/medical-devices/breast-implants/medical-device-reports-breast-implant-associated-anaplastic-large-cell-lymphoma.
31. Magnusson M. et al. The Epidemiology of Breast Implant-Associated Anaplastic Large Cell Lymphoma in Australia and New Zealand Confirms the Highest Risk for Grade 4 Surface Breast Implants. Plast Reconstr Surg. 2019 May;143(5):1285-1292.
32. Fda.gov [Internet]. USA: The Food and Drug Administration; [updated 2019 September 12; cited 2020 February 16]. Available from: https://www.fda.gov/medical-devices/medical-device-recalls/allergan-recalls-natrelle-biocell-textured-breast-implants-due-risk-bia-alcl-cancer.
33. Jones D.P. Cultural Views of the Female Breast. ABNF. 2004 Jan-Feb;15(1):15-21.
34. Helms R.L., O'Hea E.L., Corso M. Body Image Issues in Women With Breast Cancer. Psychol Health Med. 2008 May;13(3):313-25.
35. Pérez-San-Gregorio M.A., Martín-Rodríguez A., Arias-Moreno M.J., Rincón-Fernández M.E., Ortega-Martínez J.I. Self-reported psychological development in cosmetic breast surgery patients. Medicine (Baltimore) [Internet]. 2016 Dec 9;95(49):e5620. Available from: http://dx.doi.org/10.1097/MD.0000000000005620
36. Papadopulos N. et al. Quality of life, personality changes, self esteem, and emotional stability after breast augmentation. European Journal of Plastic Surgery. 2014 May 9;37:479-488.
37. Mallucci P., Brandford O.A. Concepts in Aesthetic Breast Dimensions: Analysis of the Ideal Breast. J Plast Reconstr Aesthet Surg. 2012 Jan;65(1):8-16.