

Pratique Clinique et Investigation

Clinical and Radiological Investigation of Silicone Breast Implants (Breast Implants)

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ABSTRACT

BACKGROUND

The radiographic manifestations of breast augmentation complications and unusual techniques are diverse, and with the increasing prevalence of breast augmentation, the radiologist must be aware of the range of manifestations of complications and less frequently used augmentation techniques to prevent poor prognosis.

METHODS AND MATERIALS

The archives of the Radiology Department and the records of 450 patients were reviewed between 2020 and 2024 at Al-Mouwasat Hospital, focusing on radiological investigations for cases of silicone breasts, considering that these cases are rarely admitted to the hospital. Data was collected based on a scientific research form that includes age, radiological investigations, And complications among patients.

RESULTS

Ultrasound was performed for 250 patients, plain imaging was performed for 50 patients, mammography was performed for 10 patients, MRI was performed for 117 patients, and CT was performed for 23 patients. Wall thickening was observed on the CT scan by 10%, calcification by 5%, and the percentage of presence of breast implants. The percentage of cosmetic breast implants is 70%, and the percentage of cosmetic breast implants is 30%. The most common early complication is capsular contracture, 35%, and hematomas, 29%. The most common late complication is extracapsular rupture, 82%. Most of the urethral cases have normal echographic imaging, 80%. With the resonator, implant rotation is observed. At a rate of 10%, and implant migration was 10%, ruptures occurred in 38.4% of patients, and the most common characteristic sign seen in ruptures is the LIGUIUE sign, and the percentage of tumors after implantation was 29%.

CONCLUSION

Breast MRI is the imaging modality of choice to evaluate implant integrity and potential breast augmentation-related complications when conventional imaging findings are equivocal.

Citation: Rawnak ALmidani, Clinical and Radiological Investigation of Silicone Breast Implants (Breast Implants). Prac Clin Invest 5(1): 1-6.

KEYWORDS

Evaluation; Clinical; Radiological; Breast implant; Silicone breast implants

INTRODUCTION

one of the key elements of a successful breast augmentation, and silicone implants have undergone modifications. Since the US Food and Drug Administration reapproved silicone implants in 2004, silicone has become the most widely used material in filling implants and materials. The newest generation of silicone implants is distinguished by increased structural stability and a textured surface. Large in shape, surface, and materials used in filling, such as saline versus silicone [1].

More structural stability, a textured surface, and a cohesive gel that maintains its natural shape in vivo are the distinguishing features of the most recent generation of silicone implants [1].

Since more and more women are getting breast implants, radiologists need to understand how typical breast implants appear on imaging tests, both normally and abnormally. As MRI of silicone breast implants promises great sensitivity and specificity, diagnostic imaging studies like mammography, ultrasonography, and MRI are used to evaluate the integrity of the implant, detect anomalies in the implant, and identify breast diseases unrelated to the implant [2].

METHODS AND MATERIAL

Complex breast augmentation procedures and unconventional methods might present with a variety of radiological presentations. In order to avoid a poor prognosis, radiologists treating breast augmentations should be knowledgeable about the variety of risks and less frequently utilized augmentation techniques, and the purpose of this study (Retrospective style) is to keep track of the radiological examinations done on silicone breast implants.

Where 450 patients underwent silicone breast implants at Al-Mouwasat University Hospital in Damascus Between 2020 and 2024 as a result of mastectomy and reconstruction or aesthetic surgery, with a focus on radiological investigations for silicone breast cases which are rarely admitted to the hospital the archives of the Radiology Division and the records of Al-Mowasat Hospital were examined. Based on a scientific research form, information was gathered about the patients' age, radiological examinations, and complications.

The hospital's ethics committee gave its informed consent for this study to be carried out.

Statistical analysis using Excel and SPSS-28 was done, with percentages and frequencies being used to quantify qualitative variables.

RESULTS

The number of patients reached 450 patients who visited Al-Mouwasat University Hospital in Damascus and had silicone breast implants, either for cosmetic reasons or due to mastectomy and reconstruction. We found that the number of patients who had an echographic procedure was the most common at a rate of 55.55% (Table 1).

Radiographic examination	Number	percentage
X-Ray	50	11.1%
MRI	117	26%
CT Scan	23	11%
Mammography	10	4.5%
Ecography	250	55.55%

Table 1: The research patients' radiological examinations reveal.

On the CT scan, it was noted that there was wall thickening at a rate of (9%) (n=2), and the percentage of calcification in patients was (4.5%) (n = 1) (Table 2).

CT funding	Number	percentage
Presence of wall thickening	2	9%
Calcification	1	4.5%

Table 2: Funding of CT Scan.

We discovered that, of the total number of female patients (n = 360), 80% were between the ages of 35 to 45, and 20% were above 45 (n = 90) (Table 3).

Age of patients	Number	percentage
35-45 years	360	80%
Over 45 years	90	20%

Table 3: Age of patients.

30% percent of patients (n = 66) place an implant for cosmetic purposes, and 70% percent of patients (n = 384) install an implant for manufacturing purposes (Table 4).

Justification for implant placement	Number	percentage
Cosmetics	66	30%
Manufacturing	384	70%

Table 3: Justification for implant placement.

The patients had several complications after three years, as shown in Table 5.

Early complications	percentage
Sepsis	6%
Serous tumors	25%
Hematoma	29%
Abscesses	5%
Portfolio shrinkage	35%

Table 5: Early complications after 3 years.

After 15 years, we found that the rate of intracapsular perforation was 18%, and the rate of extracapsular perforation was 82%.

200 instances of normal echography (rate of 80%), 10 cases of capsular thickening (rate of 6%), 10 cases of capsular calcification (rate of 6%), and 25 cases of capsular contracture (rate of 10%) were found in our distribution of the echography results.

We have shown the types of breast implants: round or circular implants, accounting for 25%, teardrop-shaped implants, accounting for 25%, single-cavity implants, accounting for 25%, and double-cavity implants, accounting for 25%.

Several complications were diagnosed with MRI, including implant rotation at a rate of 10%, while the incidence of implant migration was 9%.

MRI findings for breast implants include capsular thickening in 15% of cases, a minor effusion in 8% of cases, the development of deep folds in 2% of cases, and non-uniformity in the implant fluid signal in 15% of cases.

An MRI of 117 individuals revealed 45 ruptures, or 38.4% of the total. Eighty percent of the rupture instances were of the intracapsular type. The emergence of a subcapsular line (35%), the DOPLET sign (10%), the CVOOSE sign (10%), and the KEYHOLE sign (10%) are among the indicators that can be noticed on an MRI. 45% for LIGUIUE The rate of extracapsular tear is 20% and the STEPLADDER score is 2%. Resonance, in which silicone fluid is visible outside the capsular layer, is used to identify it.

DISCUSSION

The number of patients reached 450 patients who visited Al-Mouwasat University Hospital in Damascus and had silicone breast implants, either for cosmetic reasons or due to mastectomy and reconstruction. We found that the most frequent radiographic examination was performed on patients who had silicone breast implants, at a rate of 55.55%. Perhaps the reason is that it is safer than other radiological examinations.

For the patients who did not exhibit any severe symptoms, X-rays were obtained based on basic follow-up silicone imaging, which revealed the presence of a breast implant. Through ultrasound, it was discovered that most patients come to the clinics with a vague breast complaint or simply to feel reassured. If there is any suspicion of an implant perforation—in this case, caused by trauma to the breast - an MRI is conducted. or spontaneous perforation, and no pathological radiological indications were found on the chest x-ray.

We observed in our investigation the sensitivity of computed tomography (CT) in identifying surrounding calcifications and precisely determining the thickness of the capsule wall.

According to the recommendations of the Radiological Society of America (RSNA) and the US Food and Drug Association (FDA), it is recommended to conduct a breast resonator to evaluate implanted breasts by performing routine T1\T2\STAIR series and without injections, and to emphasize that the study is performed with the resonator on a closed magnetic resonance device with a magnetic field strength of 1.5 Tesla and above, and using a special cable with the breast.

Within 1 to 5 years, cases of fluid accumulation around the implant were monitored with the resonator, and the rate was 46%. Through monitoring, variable resorption was observed extending up to 3 months and relapse. The rate of infection from breast implants was 8%. It was diagnosed with echo and resonator. The rate in our study is consistent with the international study, and the tumors seen after implantation were 29%. It is higher than the international rates mentioned in the American Radiological Society, which were 5% for diagnosing tears. It was close to the international rates in our study: intracapsular rupture is 80%, in American studies it is 78%, on average, extracapsular rupture is 10%, and it is consistent with our study. [3,4]

CONCLUSION

It is critical that the radiologist understands the various techniques for breast augmentation and the risks involved. While assessing breast implants can be challenging, when traditional imaging results are inconclusive, breast MRI is the preferred imaging modality to assess implant integrity and potential problems associated to breast augmentation.

DECLARATIONS

Ethics Approval and Consent To Participate

The study protocol was approved by Al-Sham Private University Research Ethics Committee and Al-Mowasat Hospital Ethical Committees. The 1964 Helsinki Declaration and its subsequent amendments, as well as equivalent ethical norms, were followed in all procedures carried out in studies involving human subjects, whether they were national or institutional research committees.

Consent for Publication

Not applicable.

Availability of Data and Materials

All data related to this paper's conclusion are available and stored by the authors. All data are available from the corresponding author on a reasonable request.

Conflict of Interest

The authors declare that they have no conflict of interest.

Funding

No specific grant from ASPU or any other governmental, private, or nonprofit funding organization was given for this research.

Authors' Contributions

Dalia ALmuhimd, Malak Obaid, Manal ALmahmoud, conceptualized the study, wrote the study protocol, carried out the statistical analysis, and contributed to data collection. Khalid Khattab also helped interpret the findings, searched the literature, wrote the main manuscript, and revised the draft with Rawnak ALmidani. The final manuscript was read and approved by all authors.

Acknowledgments

We are grateful to Al-Sham Private University's management for their assistance with medical education and research. We express our gratitude to the Al-Mowasat Hospital management, the resident physicians, and Drs. Khaled Khattab and Rawnak ALmidani for their support. oversight of the document.

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