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ORIGINAL ARTICLE BREAST SURGERY

The New Trend of Pre-pectoral Breast Reconstruction: An Objective Evaluation of the Quality of Online Information for Patients Undergoing Breast Reconstruction

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Abstract The Web has increasingly become the major source of information about health care, and patients who need to undergo breast reconstruction often use the internet to acquire an initial knowledge on the subject. We would like to present our study that investigates the quality of published information on pre-pectoral breast reconstruction. We searched the term "Pre-pectoral breast reconstruction" on Google® and Yahoo®. Forty-two web sites were selected and underwent qualitative and quantitative assessment using the expanded EQIP tool. The analysis of document contents showed a critical lack of information about qualitative risks and side-effects descriptions, treatment of potential complications, alert signs for the patient and precautions that the patient may take. Health professionals should inform patients about the potential difficulties of identifying reliable informational web sites about pre-pectoral breast reconstruction. The quality of available information should be improved, especially the important topics included in the content data section of the modified EQIP tool.

Level of Evidence IV This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

Keywords Immediate breast reconstruction · Pre-pectoral implant · Equip test · Breast cancer

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Introduction

Breast cancer patients usually have a great need for information deal with their difficult situation. The Web has increasingly become the major source of information about health care and available surgical treatment options with over 50% of the EU population [1] using it to search for health information online. Cancer represents one of the most commonly searched health topics online with breast cancer being the most commonly researched [2]. According to our experience, patients undergoing breast reconstruction often use the internet to acquire an initial knowledge on the subject, even before consulting a medical expert in the field. Walden et al. [3] showed that the internet is the primary source of information on complications for patients and that the biggest influence on a patient's decision to undergo breast augmentation is their plastic surgeon's web site. The internet is an uncontrolled space, and the information presented is not subjected to any control or peer review processes [4]. For this reason, we might only assume that the informing institution provides accurate, professional and unbiased medical information [5].

According to World Health Organization [6], breast cancer is the most common malignancy in women worldwide (excluding non-melanoma skin cancer) [7, 8] and its incidence is expected to exceed all cancers by 2020 [9, 10].

Immediate breast reconstruction (IBR) raised recently [11] and nowadays is performed in 54% of invasive cancer cases and 63% of ductal carcinoma in situ cases [12]. In 2002, implant-based breast reconstruction surpassed autologous techniques as the most common method performed in the USA [13]. Immediate pre-pectoral breast reconstruction can provide a valid and safe aesthetic result with high levels of satisfaction and quality of life [14, 15] representing an opportunity to improve upon current reconstructive methods and to minimize complications such as postoperative pain, breast animation deformity [16] and capsular contraction [17, 18].

For all these reasons, recently pre-pectoral breast reconstruction has gained popularity in the plastic surgery community, with an increasing number of patients seeking information on such as indications, contraindications, possible complications, advantages, disadvantages and good practitioners, prior to consulting a specialized surgeon [19].

It seems therefore logical to assume that this approach to the disease and its treatment may influence the final decision of patients, probably even before approaching with a health practitioner and being aware of inclusion and exclusion criteria related to this procedure. Access to a wide range of medical information is available through an estimated 20,000–100,000 health-related web sites [20]. However, the quality of internet information has not been clearly assessed and there is no correlation between the methods used to rank the web sites indexed by search engines such as Google® or Yahoo® and the quality level of their contents [21]. Therefore, the considerable plethora of available and uncontrolled information on the Web results in disorganization, which can increase the risk of patients obtaining low-quality information [22]. To our knowledge, this is the first study to investigate the quality of published information on pre-pectoral breast reconstruction, using a validated and reliable tool such as the expanded version of Ensuring Quality Information for Patients (EQIP) instrument [23].

Materials and Methods

Study data were collected in July, 2018. Assuming that many patients explore only the first few search results [24] and assuming Google® and Yahoo® are the most popular search engine [25, 26], we searched the term "Pre-pectoral breast reconstruction" on Google® and Yahoo® including the first 50 hits. All web sites were screened for inclusion by the same author; duplicates and irrelevant web sites such as videos or blogs were excluded. The selected web sites were divided into five groups (practitioners, hospitals, healthcare portals, professional societies and encyclopedias), and the quality of information was evaluated with the expanded EQIP scale, which is a checklist applicable to all existing types of information [27].

This test is composed of 36 questions dividing information into three sections: content, structure and identification data.

The content data section analysis focuses on the medical problem and its alternative treatments or therapeutic strategies addressing quality of life issues; qualitative and quantitative benefits and risks, side-effects and complications of the treatment. In this regard, "qualitative benefits" refer to any kind of benefit related to the procedure under examination, such as improved mobility, preserved muscular function, as well as reduced postoperative pain and faster recovery. As for the second group, main "risks" such as the most common complications associated with the technique, alerts signs are identified and taken into consideration. "Quantitative benefits" and "risks" refer to percentages or statistical analysis, giving each a numerical weight. "Identification data section analysis" refers to date of revision, the name of entities that produced the document and bibliography. It assesses the reliability of information and checks whether the site is up to date or not. "Structure data section analysis" refers to readability of the document, to determine whether all information reported is accessible and understandable by patients.

Every question has equal weight of importance, scoring web sites from 0 to 36. Web sites obtaining a score of 20 or more, which corresponds to the 75th percentile, were defined as a high score web site, whereas those obtaining a score lower than 20 were defined as low score web sites.

Results

Forty-two web sites were selected and were categorized into five groups: 15 practitioners (35%), seven hospitals (15%), 12 healthcare portals (30%), seven professional societies (15%), one encyclopedia (5%). All of them underwent qualitative and quantitative assessment using the expanded EQIP tool (Table 1). The average score was fixed at 16 points. There were 14 web sites with high score (33.3%) and 28 with low score (66.7%).

The analysis of document contents showed a critical lack of information about qualitative risks and side-effects descriptions, treatment of potential complications, alert signs for the patient and precautions that the patient may take. Moreover, there is poor information about the sequence of the medical procedure, quantitative benefits and risks, quality of life issues after the procedure and often there were no other sources of information. Such a result is particularly significant in a private individual web site such as practitioners and professional societies web

Table 1 EQIP tool results applied to the 42 eligible web sites about pre-pectoral breast reconstruction research on Google® and Yahoo®

Question	Yes (%)	No (%)
Content data		
1. Initial definition of which subjects will be covered	42 (100%)	0 (0%)
2. Coverage of the above-defined subjects	41 (97.62%)	1 (2.38%)
3. Description of the medical problem	41 (97.62%)	1 (2.38%)
4. Definition of the purpose of the medical intervention	42 (100%)	0 (0%)
5. Description of treatment alternatives (including no treatment)	41 (97.62%)	1 (2.38%)
6. Description of the sequence of the medical procedure	35 (83.33%)	7 (16.67%)
7. Description of qualitative benefits	40 (95.24%)	2 (4.76%)
8. Description of quantitative benefits	4 (9.52%)	38 (90.48%)
9. Description of qualitative risks and side-effects	16 (38.10%)	26 (61.90%)
10. Description of quantitative risks and side-effects	4 (9.52%)	38 (90.48%)
11. Addressing quality of life issues	31 (73.81%)	11 (26.19%)
12. Description of how potential complications will be dealt with	7 (16.67%)	35 (83.33%)
13. Description of precautions that the patient may take	3 (7.14%)	39 (92.86%)
14. Mention of alert signs that the patient may detect	3 (7.14%)	39 (92.86%)
15. Addressing medical intervention cost and insurance issues	9 (21.43%)	33 (78.57%)
16. Specific contact details for hospital services	35 (83.33%)	7 (16.67%)
17. Specific details of other sources of reliable information/support	8 (19.05%)	34 (80.95%)
18. The document covers all relevant issues on the topic	3 (7.14%)	39 (92.86%)
Identification data		
19. Date of issue or revision	22 (52.38%)	20 (47.62%)
20. Logo of the issuing body	41 (97.62%)	1 (2.38%)
21. Name of persons or entities that produced the document	18 (42.86%)	24 (57.14%)
22. Name of persons or entities that financed the document	6 (14.29%)	36 (85.71%)
23. Short bibliography of evidence-based data used in the document	3 (7.14%)	39 (92.86%)
24. The document states if and how patients were involved/consulted in its production	1 (2.38%)	41 (97.62%)
Structure data		
25. Use of everyday language, explains complex words or jargon	36 (85.71%)	6 (14.29%)
26. Use of generic names for all medications or products	3 (7.14%)	39 (92.86%)
27. Use of short sentences	33 (78.57%)	9 (21.43%)
28. The document personally addresses the reader	41 (97.62%)	1 (2.38%)
29. The tone is respectful	42 (100%)	0 (0%)
30. Information is clear	42 (100%)	0 (0%)
31. Information is balanced between risks and benefits	7 (16.67%)	35 (83.33%)
32. Information is presented in a logical order	40 (95.24%)	2 (4.76%)
33. The design and layout are satisfactory	39 (92.86%)	3 (7.14%)
34. Figures or graphs are clear and relevant	8 (19.05%)	34 (80.95%)
35. The document has a named space for the reader's notes	10 (23.81%)	32 (76.19%)
36. The document includes a consent form, contrary to recommendations	0 (0%)	42 (100%)

sites with a mean score, respectively, of 18.8 (only 40% scoring more than 20) and 17.8 (with none scoring more than 20). Healthcare portals had a mean score of 19.4, but more than two-thirds of them (70%) were rated as unsuitable or below moderate quality. The identification data section analysis showed that the majority of documents did not include the recommended identification data. Less than a third reported a bibliography of reliable data used in the document, only 18% mentioned the name of the person or entities that produced the document and only 52.38% reported the date of issue or revision. The structure data section analysis showed a critical unbalance between risks and benefits, and that most of the web sites do not provide

clear information with figures and graphs that were often not relevant and unclear.

Discussion

Current trends in breast cancer treatment showed a rise of total mastectomies and immediate breast reconstruction [28]. IBR is proven to positively affect the quality of life of the patients, without influencing cancer recurrence or survival [29, 30].

Nowadays, mainly implant-based IBR is performed by sub-pectoral placement of the implant, to achieve minor implant visibility, reduce rippling and weaken the palpability of implant edges at the upper pole. Nevertheless, elevation of the pectoralis major muscle may lead to well-known postoperative complications such as animation deformity and early postoperative pain and discomfort [31].

Pre-pectoral implant-based breast reconstruction has revolutionized the scenery of breast reconstructive surgery, as a consequence of the advantages related to preservation of the pectoralis major muscle such as the reduction of postoperative pain, significant upper limb functional advantages, improved postoperative recovery time and outcomes with the avoidance of breast animation and deformity [32, 33], whereas complication rates between pre-pectoral and sub-pectoral techniques appear to be comparable [34, 35].

In this regard, the advent of synthetic meshes as well as acellular dermal matrixes (ADM) and autologous fat grafting implementing skin envelope texture quality and coverage to the implants, as well as development of tissue perfusion technology, resulted in excellent functional and cosmetic results, with several authors reporting a decrease in capsular contracture rates [36–44].

Nevertheless, the role of pre-pectoral breast reconstruction in specific conditions or in the setting of radiotherapy has not been exhaustively addressed yet [45, 46]. Indications might be extended in the future, especially taking into account the improvements given by the integration of autologous fat transfer, as a complementary part of the reconstructive process. However, recruitment of patients to undergo this procedure still requires accurate selection and adequate preoperative consultation [47].

Patients are increasingly using the Internet as a vehicle to acquire information about their health problems [48] especially in regard to cancer-related information overall and breast cancer in particular [49]. As a result of this trend, healthcare professionals have to face much more informed patients. We are observing a shift from the "informed patient" to the "participative patient," as a result of improved access to healthcare information, primarily from the Web [50]. Nevertheless, although patients undoubtedly have the chance to access more data, we must question whether it is an accurate and reliable source of information.

Health professionals should inform patients about the potential difficulties in identifying reliable information on web sites. It is necessary to develop skills beyond our usual conception of health literacy that include computer literacy and the ability to seek online information (i.e., how to frame an appropriate search strategy and filter results to obtain relevant information) [51]. In fact, finding and dealing with high-quality internet information on breast cancer surgery might be challenging, even for individuals with high health literacy. Plastic surgeons themselves should use a reliable bibliography to describe their practice on their web sites and refer to papers with high levels of evidence, published in journals with high impact factors to keep themselves up to date.

In this regard, clinical data on pre-pectoral breast reconstruction is still rather recent; nevertheless, the literature is replete with reports on the use of this technique in multiple settings and with a wide selection of patients, representing a valid and safe procedure when indicated [52, 53].

As healthcare professional and reconstructive surgeons, we are called on to play a determinant role in orienting the patient toward a better comprehension and management of the "breast cancer experience," to involve and counsel them for the best surgical option, during the "decision making." Surgeons should prompt the patients to pay attention to the sources of the information they find on the Web, addressing them to "safe sites" to deepen the knowledge with more reliable and complete sources. In this regard, recent studies investigated the reliability of online information searched by patients with breast cancer. A lack of some relevant topics in clinical information was evidenced [54], with a prevalence of web sites with inaccurate information on breast cancer over highly accurate government, charity and formal educational web sites [55]. Educational web sites, encompassing scientific journals and health portals, appeared to be more accurate [56], whereas the best readability was found in health portals, along with government and non-profit web sites [1]. Lynch et al. [25] investigated the quality and readability of patient information available on the internet in regard to breast reconstruction postmastectomy, founding it poor in quality and accessibility. Our study indicates that the available information about pre-pectoral breast reconstruction on the Internet varies in quality. In particular, healthcare portals collected higher EQIP mean values than practitioners and professional societies web sites, with all categories showing low reliability in bibliography. Hospital web sites had higher reliability with 57.14% of them scoring more than 20. Compared to that, web sites from practitioners and

professional societies had significantly lower scores. We might assume that this difference is possibly due to the fact that the frequent need for ADM or synthetic mesh in pre-pectoral breast reconstruction has a short-term higher economic impact compared to sub-muscular breast reconstruction. These short-term costs have a high impact for private sources, while hospitals evaluate long-term global and social costs that are comparable or even lower in the setting of pre-pectoral reconstruction [57].

Moreover, most of the assessed web sites were reported to lack information about topics included in the content data section. The lowest scores were obtained in those questions concerning risk and side-effects, managing potentials complications, detecting alerts signs and addressing quality of life issues. None of the web sites assessed in this study met all 36 items of the modified EQIP instrument. We report on web sites with incomplete, unregulated or even incorrect information. The reason can be identified in the lack of any peer review or quality management process. Search engines such as Google® or Yahoo® rank their results as a function of page views and are not based on the quality of information.

Our study though presents some limitations. First, all the web sites were assessed by a health professional with a high level of knowledge of the subject, but only the patient's point of view could confirm that the information from the Web is adequate and relevant to their needs and level of knowledge. Second, because the investigation was carried out by the same person, this might generate a bias considering the unavoidable subjective element in this type of evaluation. Third, web sites in languages other than English were excluded from our judgment and their quality remains unknown. However, most of the population in developed countries speaks English [58] and we searched with English keywords, expecting to find web sites in English mainly. Finally, only the first 50 hits on Google® and Yahoo® were screened for inclusion, and because the ranking of the web sites on the internet keeps changing we should consider this study only as a temporary picture of the information available for the patient.

Conclusion

Online healthcare information is an increasingly common way for people to gain knowledge about their disease and patients suffering from breast cancer in particular consider the Web as the major source of information to deal with their difficult situation. This study offers a panoramic but reliable report on the existing data regarding the pre-pectoral breast reconstruction technique at the disposal of patients. The quality of available information should be improved, especially the important topics included in the content data section of the modified EQIP tool. High-quality and easy-accessible online information could meet the needs of an increasing number of patients; eventually, it could lead to significant improvements in the management of the "breast cancer experience" and understanding of the different steps, calibrating the expectations and consolidating their decisions about surgical treatment.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

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