

Effectiveness and Safety of Autologous Fat Transfer in Various Treatment Protocols

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Valorization addendum

Introduction

Knowledge gathered through scientific research is particularly of value when it serves some form of socio-economic purpose. The description of value, or “valorization”, is imperative in justifying the costs that are involved with scientific research, costs that are often financed by public authorities, government bodies or through funding. In this chapter the valorization of this thesis and the PhD-trajectory that preceded it will be discussed in the light of its relevance, target audiences, products or services, innovation and realization.

The primary focus of this thesis has been on Autologous Fat Transfer (AFT) in breast surgery, which – for the purpose of this discussion - can be divided in breast reconstruction and breast augmentation. The main reason for breast reconstruction is breast cancer, which is still the most common form of cancer in women worldwide with over nearly 1.7 million new cases diagnosed in 2012 ¹. In the Netherlands this translates to one in eight women, but fortunately early screening and targeted therapies have greatly improved survival ^{1,2}. Numbers on (type of) breast reconstruction performed in the Netherlands are scarce and vary greatly but overall it is thought that 30-50% of Dutch women undergo mastectomy and that less than 15% thereof undergo breast reconstruction. The annual rate of some form of breast conservative therapy (BCT) is currently estimated at 60% ³. The primary goal of both forms of reconstruction (following mastectomy or BCT) is obtaining the best cosmetic results since unfavorable cosmetic outcomes have been proven to significantly decrease the quality of life and psychosocial functioning ^{4,5}. Breast reconstructive options generally encompass the use of implants or autologous tissue. The latter can exist of various free or pedicled flaps following mastectomy or volume displacement and replacement techniques following BCT. However, using autologous tissue in breast reconstruction is not flawless. In some studies complications rates following DIEP reconstruction and poor cosmetic outcome following dis-/replacement techniques both reach 30% respectively ⁶⁻¹⁰. Furthermore, the widespread use of silicone breast implants in both reconstruction and augmentation has recently, again, been questioned due to new discoveries in both ASIA syndrome ¹¹ as well as BIA-ALCL ¹². These doubts about silicone implants, brings us to the second focus of

this thesis in regard to breast surgery, namely; breast augmentation for cosmetic benefit. Despite the forewarnings about ASIA syndrome and BIA-ALCL the number of women who underwent breast augmentation in the Netherlands is actually increasing. According to the Dutch Breast Implant Register (DBIR), the number of breast operations with the use of implants increased from 6000 in 2013 to 9000 in 2015¹³. Furthermore, out of the 13.600 patients (25.500 implants), that have been recorded between April 2015 and December 2016, 75% was treated for cosmetic purposes¹³.

In conclusion, in plastic surgery breast reconstruction and breast augmentation are the most frequently performed reconstructive and cosmetic procedures respectively. AFT is a potential new technique which may complement or (completely) replace existing techniques of breast reconstruction/ augmentation. Therefore, AFT could potentially become an important attribute to the armamentarium of the breast surgeon.

Relevance of scientific results

The relevance of this thesis on breast surgery lies mainly in the endorsement of AFT as a novel technique. A technique that has fewer complications and the potential to not only complement current methods of breast reconstruction and augmentation but also to – one day – replace them. We were able to highlight both the efficacy in terms of volume retention and patient's/ surgeon's satisfaction and the safety by illustrating currently acceptable oncological recurrence rates. Furthermore, by elaborating on hiatuses between basic science- and clinical studies as well as between the performance of AFT pioneers and less experienced surgeons, we provided a base for future studies. The results from these future studies bring us one step closer to successfully implementing this technique in mainstream breast surgery. It is currently too soon to make comparisons in cost-effect analysis between AFT and other forms of breast reconstruction/ -augmentation. However, a recent study by Sorin et al. estimated the costs of a single 500ml AFT procedure, with their apparatus, at 9.28 euro, or 10.52 USD. Thereby, this thesis is considered to be relevant for future female patients seeking breast reconstruction or augmentation, as well as in reducing socio-economic costs.

Target population

The results of this thesis are relevant for researchers and other professionals in the medical field with special interest in breast reconstruction and augmentation. In addition, this thesis is of interest to breast surgeons, surgical oncologists, plastic surgeons and dedicated nurses.

Activities and products

The beauty of a thesis regarding the use of AFT is that it does not directly translate into a certain activity or more importantly; a product. The "product" that is used in AFT is – as the name suggests – "autologous", meaning it is merely redistributed, without the addition of synthetic material. However, this does not limit its potential since the AFT "activities" – or better indications – are numerous, ranging from volumetric enhancement to the correction of surgical defects.

Innovation and realization

The use of AFT in addition to or instead of conventional breast reconstruction or augmentation is innovative on its own, i.e. it precludes a whole new chapter in the development of breast surgery. As was stated in this thesis there are still remaining questions to be answered such as on oncological safety and follow-up on volume retention. Nonetheless, through the various benefits of AFT that have been highlighted in this thesis, the authors, emphasized the undeniable place AFT will take in the future repertoire of breast reconstructive possibilities. As was discussed in the introduction current breast reconstructive options to restore lost volume, consist mainly of the use of either local or distant autologous tissue or breast implants. Herein, AFT offers numerous options to both aid or totally replace these forms of reconstruction. The former is already practiced on a large scale with final "touch-up" AFT corrections of small local defects being common practice in certain centers. The latter will certainly gain more recognition when volumetric results from mega-volume enhancement techniques like BRAVA^{14,15} become more apparent. Therefore, the author believes that with the results from this thesis a more prominent role will be reserved for AFT in future breast reconstruction, clinical guidelines.

The endorsement of AFT in the Netherlands is an ongoing process that has already known more than a few hiccups along the way in terms of insurance coverage. Currently, it is mainly hospital funded and on a scientific bases, such as in the case of the BREAST-trial (ClinicalTrials.gov identification number NCT02339779) ¹⁶. Furthermore, it is self-funded by patients in various clinics nationwide for cosmetic purposes but with ongoing developments we hope to demonstrate its added value and achieve full insurance coverage and implement this promising technique in reconstruction patients also.

Facial rejuvenation and scars

Besides the indications for AFT in breast surgery, I want to briefly highlight the value of its use in facial rejuvenation and in the treatment of scars. Currently, facial rejuvenation is realized with surgery and increasingly with the use of dermal fillers. While the use of dermal fillers can be seen as a strictly cosmetic procedure, they can also sometimes be utilized in reconstructive procedures of the face. None of the currently available fillers are beatific and since its use is expanding it is appropriate to explore the opportunities of AFT as a potential, long-term, biocompatible filler.

In regard to scars, it has been illustrated in this thesis, that scars can have debilitating effects on a person's quality of life and that important aspects of a scar were positively influenced by AFT. Therefore, this thesis provided a stepping stone in the process of further investigations on the scar-/ skin healing properties of AFT.

References

1. Ferlay J SI, Ervik M, Dikshit R, Eser S, Mathers, C RM, Parkin DM, Forman D, Bray F. GLOBOCAN 2012: estimated cancer incidence, mortality and prevalence worldwide in 2012, v1.2. International Agency for Research on Cancer, Lyon. 2013; http://globocan.iarc.fr/Pages/fact_sheets_cancer.aspx. Accessed 06-08-2017.
2. Laronga C. Patient education: breast cancer guide to diagnosis and treatment (beyond the basics). 2016; <https://www.uptodate.com/contents/breast-cancer-guide-to-diagnosis-and-treatment-beyond-thebasics>. Accessed 06-08-2017.
3. NABON breast cancer audit (NBCA); Jaarrapportage 2013. https://www.dica.nl/jaarrapportage-2013/#dica_rapportages_nbca. Accessed 09-05-2017.
4. Waljee JF, Hu ES, Ubel PA, Smith DM, Newman LA, Alderman AK. Effect of esthetic outcome after breast-conserving surgery on psychosocial functioning and quality of life. *Journal of clinical oncology : official journal of the American Society of Clinical Oncology*. 2008;26(20):3331-3337.
5. Hau E, Browne L, Capp A, et al. The impact of breast cosmetic and functional outcomes on quality of life: long-term results from the St. George and Wollongong randomized breast boost trial. *Breast cancer research and treatment*. 2013;139(1):115-123.
6. Aaronson NK, Bartelink H, van Dongen JA, van Dam FS. Evaluation of breast conserving therapy: clinical, methodological and psychosocial perspectives. *European journal of surgical oncology : the journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology*. 1988;14(2):133-140.
7. Haloua MH, Krekel NM, Winters HA, et al. A systematic review of oncoplastic breast-conserving surgery: current weaknesses and future prospects. *Annals of surgery*. 2013;257(4):609-620.
8. Vos EL, Koning AH, Obdeijn IM, et al. Preoperative prediction of cosmetic results in breast conserving surgery. *Journal of surgical oncology*. 2015;111(2):178-184.
9. Wang HT, Barone CM, Steigelman MB, et al. Aesthetic outcomes in breast conservation therapy. *Aesthetic surgery journal*. 2008;28(2):165-170.
10. Hofer SO, Damen TH, Mureau MA, Rakhorst HA, Roche NA. A critical review of perioperative complications in 175 free deep inferior epigastric perforator flap breast reconstructions. *Annals of plastic surgery*. 2007;59(2):137-142.
11. Pavlov-Dolijanovic S, Vujasinovic Stupar N. Women with silicone breast implants and autoimmune inflammatory syndrome induced by adjuvants: description of three patients and a critical review of the literature. *Rheumatology international*. 2017.
12. Ramos-Gallardo G, Cuenca-Pardo J, Rodriguez-Olivares E, et al. Breast Implant and Anaplastic Large Cell Lymphoma Meta-Analysis. *Journal of investigative surgery : the official journal of the Academy of Surgical Research*. 2017;30(1):56-65.
13. (DICA) DICA. Jaarrapportage; Dutch Breast Implant Registry. Netherlands2016.
14. Khouri RK, Rigotti G, Cardoso E, Khouri RK, Jr., Biggs TM. Megavolume autologous fat transfer: part II. Practice and techniques. *Plastic and reconstructive surgery*. 2014;133(6):1369-1377.
15. Khouri RK, Rigotti G, Cardoso E, Khouri RK, Jr., Biggs TM. Megavolume autologous fat transfer: part I. Theory and principles. *Plastic and reconstructive surgery*. 2014;133(3):550-557.
16. Krastev T, Hommes J, Piatkowski A, van der Hulst RRWJ. Breast reconstruction with external pre-expansion and autologous fat transfer versus standard therapy (BREAST). Maastricht University Medical Center (MUMC); 2017.