

Aesthetic outcome as a goal using pectoral muscle-strip in recurrent subareolar abscess of the breast and for double subdermal flap in modelling of the inverted nipple

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Recurrent subareolar abscess (RSA) is an uncommon benign disorder of the non-lactating young and mid-aged female breast [1]. It was first described by Zuska et al. [2], in 1951, as a chronic inflammation of the sinuses of lactiferous ducts with a clinical spectrum that may manifest as nipple discharge or distortion, recurrent subareolar abscess or mamillary duct fistula [1–3]. Epithelial metaplasia of the lactiferous ductal system is considered as an important etiological factor [4]. Epithelial shreds and debris lead to ductal occlusion, thus to ductectasia and secondary infections and abscess formation.

The definitive treatment of chronic peri-ductal mastitis requires radical excision of the abscess along with major ducts and the discharged, distorted central portion of the mamilla and has been described in detail by several authors [3, 5, 6]. Nevertheless, published series described recurrence rate of 9 % [3] and 28 % [5] following such procedures. In some rare cases, when peri-mamillary excisions failed, even mastectomy was performed [3] as a radical outcome. In 2009, Low and Barry [1] published a sally procedure with adaptation of a pectoral major muscle flap. We successfully adapted a modification of that procedure in cases of recurrent peri-ductal mastitis refractory to repeated radical surgeries, ductectomies and courses of steroid and antibiotic treatments: total major duct excision was performed from a peri-areolar incision with central posterior mamillectomy and partial excision of the distorted

nipple-areolar complex. Inflammatory debris and necrotic tissue were thoroughly debrided prior to preparation for the “pectoral-strip” flap. The pectoral strip is formed as a flap of the lateral edge of the pectoral muscle with a vascular shaft. A tunnel wide enough to comfortably transmit the flap without undue tension causing vascular compromise was fashioned through the breast tissue, extending from the peri-areolar skin incision to the cephalad end of the muscle flap. The free edge of the mobilized flap is delivered via the tunnel to the sub-areolar space and sutured under the mamillary and surrounding tissues (Fig. 1). Three months later, the inverted mamilla was reconstructed in local anaesthesia. The nipple was averted with a traction suture and two triangular incisions were made. The flaps were deepithelialized and the pectoral muscle underlying the dermis was prepared creating two muscular-dermal flaps. A tunnel is prepared under the mamilla and the pectoral muscle-dermal flaps on both sides of the inverted nipple are advanced in opposite position beneath the nipple and stitched. A modelled “donut” dressing was applied and continuous traction of the nipple lasted 3 weeks to avoid compression of the nipple and to achieve persistent projection.

Recurrent sub-areolar abscess (RSA) is an uncommon breast disease of which the pathogenesis is still largely unknown. Lannin [4] treated 67 cases during 22 years. In an analysis of 58 patients with RSA, Li et al. [3] performed 33 major ductectomies in addition to the central excision of the distorted nipple and reported a recurrence rate of 9 %; however, even two mastectomies were performed for this benign condition. RSA is strictly a benign disorder of the non-lactating young and mid-aged female breast. Smoking is supposed as an important risk factor [7], causing local microvascular ischaemia in the peri-areolar region preventing resolution of localised infection leading to recurrent

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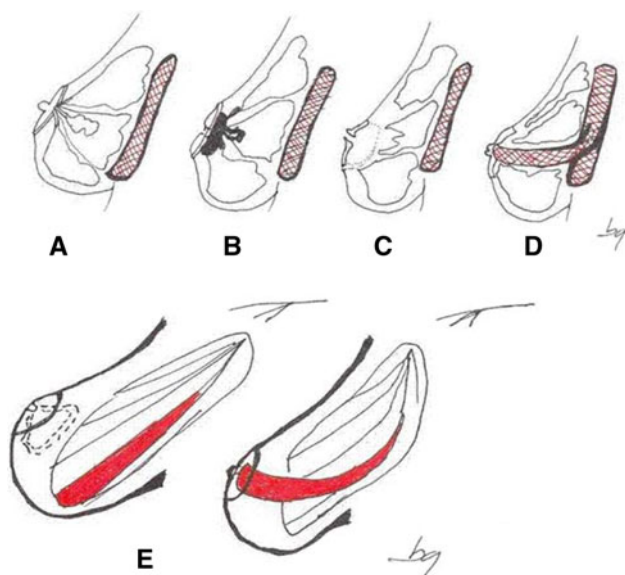


Fig. 1 a Normal anatomy b subareolar abscess, infected ducts, inverted nipple c situation after radical exstirpation of infected tissues d reconstruction with the pectoral muscle strip e position of the muscle strip

abscess formation. Patients with RSA must undergo pre-operative mammographic and ultrasound imaging modalities to exclude malignancy. The surgical management of peri-ductal mastitis may be divided into those which do and those which do not include excision of the lactiferous ducts. The former includes simple incision and drainage of recurrent abscesses and fistulotomy. The latter includes microdochectomy, fistulectomy and total major duct excision. Surgical radicality in refractory, recurring septic cases may extend to total excision of the nipple-areolar complex, opened wound treatment and even subcutaneous mastectomy [3, 4]. The aforementioned, repeated radical interventions often lead to distorted nipple-areolar complex and significant breast deformities necessitating further breast reconstructions to improve aesthetic outcome for the mainly young or mid-aged patients. Pectoralis major muscle flaps are used extensively in both head and neck and breast reconstruction. According to Low, pectoralis muscle flaps provide a vascularised bed and hence better microcirculation and immune competence to the locally compromised region, optimizing healing and preventing recurrence. This function is well known and taken advantage of in the closure of recto-vaginal fistulas with gracilis muscle flaps [8], or thoracic fistulas with serratus, latissimus dorsi, or pectoral muscle flaps [9]. The interposed pectoral strip or flap does not compromise future screening mammography for cancer. According to Monticicciolo et al. [10], based on the reported

mammographic appearance following endoscopic latissimus dorsi musculo-subcutaneous flap reconstruction combined with breast conservation procedures (biquadrantectomy), it does not interfere with cancer surveillance in such patients. Helvie and Kim also reported that mammography and ultrasound facilitated excellent visualization of normal and abnormal findings of breasts reconstructed with autogenous myocutaneous flaps. In the aforementioned new technique of Low and Barry [1], the pectoral muscle flap was prepared and mobilized from the costal cartilaginous origin from an infra-mammary incision and was delivered subglandularly to the central sub-areolar space. We used a muscular strip harvested from a central approach to the inferio-lateral edge of the pectoral muscle and delivered it to the resected mamillary and sub-areolar tissues. The procedure resulted in immediate control of sepsis. Absence of further abscess formation was noteworthy. We kept in mind that preservation of the pectoral muscle is recommended for reconstruction purposes, once a subcutaneous mastectomy becomes necessary for further recurrence.

Some recent studies [11] highlighted the importance of thrombospondin released in “traumatized” skeletal muscle and its correlation with post-trauma and surrounding tissue regeneration. Another pathway of tissue regeneration surrounding muscle flaps prevails by the expression of angiogenic and conjunctive tissue (matrix growth) factors. In an in vivo study by Vogt et al. [12], such angiogenic factors (VEGF, TGF- β 1, EGF, IL-1 α , PDGF, and IGF-1) were shown to be present in the microenvironment of muscle flaps. These factors may conduce tissue regeneration by regulating cell proliferation, angiogenesis and immunomodulation of conjunctive tissue structures. In addition, Hinz [13] enlightened the complex function of the myofibroblast in tissue repair at and around muscle structures. The pectoral muscle (“muscle-strip”) was successfully used in modeling the distorted nipple. Kim et al. [14] and Wu et al. [15], reported mamilla reconstructions with double dermal and dermofibrous flaps. Their method afforded not only sufficient tissue to fill the dead space but also bulk to drive up the nipple achieving persistent projection. In our case, pectoral muscle was also used for filling the dead space in the damaged and shrunken retro-mamillary space.

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Conflict of interest All the authors disclose no financial and personal relationships with other people or organisations that could inappropriately influence (bias) their work. It is stated that there is no conflict of interest.

Ethical approval Hereby the authors state that no ethical approval was required.

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