

Bi-pedicle nipple-sparing mastectomy (modified Letterman technique) and TIGR mesh-assisted immediate implant reconstruction, in a patient with Cowden syndrome

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Abstract: Cowden syndrome, a rare genetic disorder estimated to occur in 1 in 200,000 live births and inherited as an autosomal dominant mutation in *PTEN* gene, is part of the PTEN hamartoma tumor syndrome. These patients are at risk of breast cancer, as well as cancers of the digestive tract, thyroid, uterus and ovaries. Often identified by their dentist due to characteristic papillomatosis in the gingival mucosa, they have an estimated lifetime risk of up to 81% of developing breast cancer. This article describes a relatively uncommon procedure of bi-pedicle nipple-sparing mastectomy, a modified Letterman technique, used in the setting of immediate implant based reconstruction in a patient with Cowden syndrome.

Keywords: Cowden syndrome; bi-pedicle nipple-sparing mastectomy; implant reconstruction

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Introduction

A 38-year-old patient with Cowden syndrome (1,2) referred by genetics services for high-risk surveillance and consideration of risk-reducing mastectomy. She had been on regular surveillance with annual mammography and clinical examination for a few years since her diagnosis. The patient had E-cup sized breasts with grade 4 ptosis; the sternal notch to nipple measured 29 and 12 cm from nipple to inframammary fold (IMF) and was keen to reduce to C-cup breasts. Preliminary discussions favored implant-based reconstruction following mastectomy due to bilateral procedure, the patient's desire to resume work early and look after a young and active child.

Routine annual surveillance mammogram identified a small focus of indeterminate micro-calcification in the upper outer left breast. Stereotactic core biopsy from this area showed atypical ductal hyperplasia (ADH-B3) on histology with recommendations of a hook-wire localized open breast biopsy for definitive pathology.

Breast multidisciplinary team meeting (MDT) reviewed the 7 mm area of indeterminate calcification at 3 o'clock,

80 mm from the left nipple, without any other concerning findings and normal contralateral right breast on diagnostic breast imaging. MDT discussions surrounding option of a one-stage procedure to include risk-reducing mastectomy *vs.* preliminary hook-wire localized breast biopsy for definitive histology, weighed towards initial diagnostic assessment.

In-depth discussions were undertaken with the patient following MDT recommendations but she was keen to avoid multiple procedures and recovery with additional time off work. Location of the micro-calcification and her desire to preserve both nipples, made a Wise-pattern skin-reducing mastectomy option, less favorable.

Operative technique

Patient was counseled pre-operatively and potential risks and complications outlined with clear instructions regarding postoperative care and management. Medical illustration photographs obtained with patient consent and detailed information leaflet about the procedure, including use

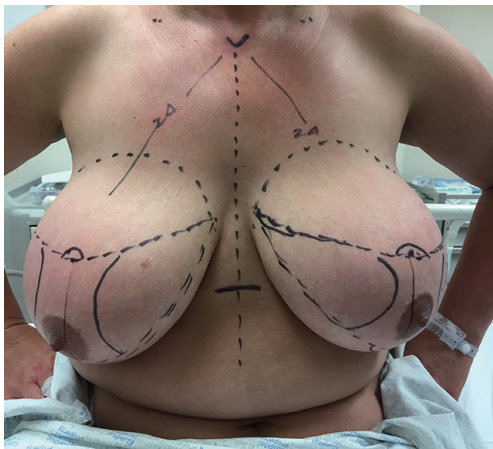


Figure 1 Preoperative skin marking.



Figure 3 Lateral placement of hook-wire visible pre-op.

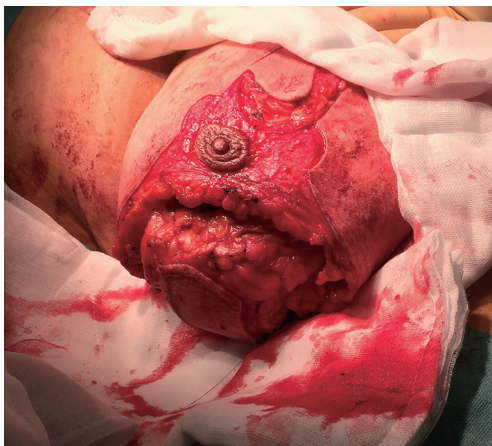


Figure 4 Bi-pedicle skin-sparing mastectomy with hook-wire *in situ*.

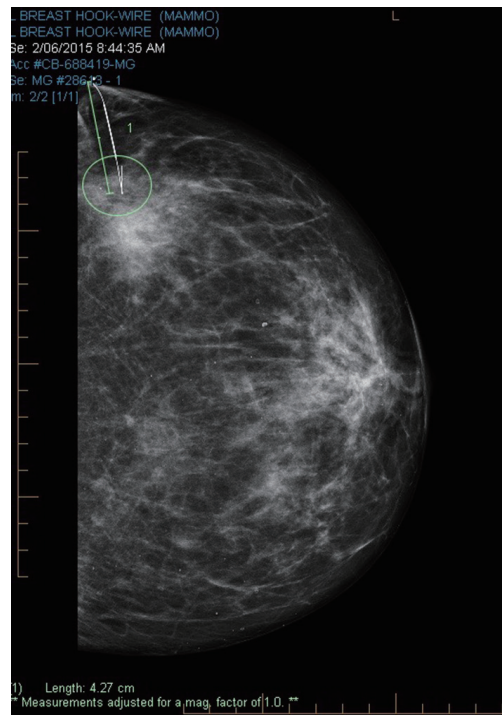


Figure 2 Mammogram post hook-wire localization.

of synthetic absorbable TIGR mesh (Novus Scientific®) provided to the patient.

Patient was warned of a higher than average risk of nipple necrosis/loss, based on the thin and narrow pedicles, with a low threshold for converting to a free-nipple graft, if intraoperative vascular compromise was evident.

Preoperative skin markings were undertaken prior to hook-wire localization in the Radiology Suite (Figures 1,2). Lateral aspect of the left breast was marked to indicate desired location of hook-wire insertion (Figure 3) to minimize risk of a separate pinhole in the skin with potential for infection in an implant setting. Prophylactic intravenous antibiotic with 2 g of Cefazolin was given on induction and continued for 24 hours postoperatively. Paravertebral blocks by a specialist anesthetist were given sequentially during surgery to assist with postoperative analgesia.

The mastectomy specimen with a paddle of skin overlying the area of interest including the hook-wire was sent for specimen X-ray to pathology (Figure 4). Specimen sectioned with hook-wire *in-situ* and imaged confirming targeted focus of calcification in the superior portion of slice 4 with good surrounding margin of normal tissue (Figure 5).

The mastectomy specimens were weighed intraoperatively with the right breast weighing 898 g and the left weighing

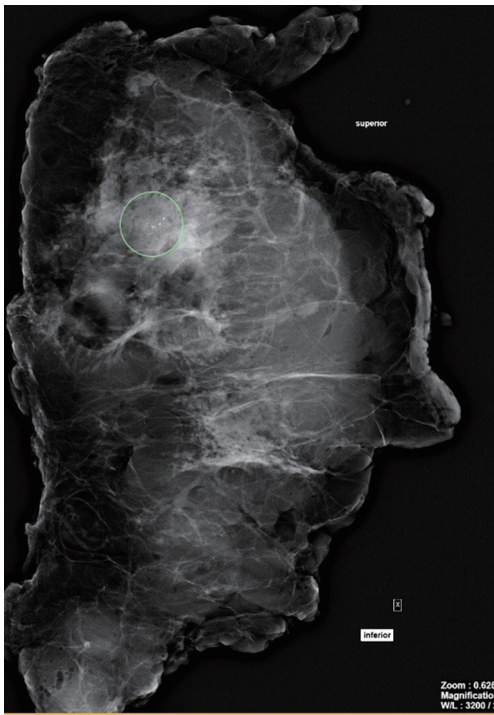


Figure 5 Specimen X-ray confirming targeted micro-calcification in the area of interest.

1,042 g. During the procedure, nipple viability was monitored regularly due to thin and narrow pedicles and was not compromised at any stage (*Figure 6*).

Pectoralis major muscle was gently lifted as per the preoperative skin markings, to create a pocket for the implant using diathermy throughout to ensure hemostasis.

Medium size 15 cm × 20 cm TIGR matrix mesh (Novus Scientific®) was used to re-create the IMF (*Figure 7*) and secured with interrupted 3-0 PDS suture (Ethicon, J&J®) (*Figures 8,9*). This synthetic absorbable mesh made from copolymer of glycolide, lactide and trimethylene carbonate, is easier to handle, produces lesser seroma with need for only one drain per side, compared to standard ADM in the author's experience. This particular sized mesh offers adequate cover for the lower 1/3 of medium to large sized implants (*Figure 10*).

Temporary sizer used to estimate implant size and confirm closure of skin wounds without tension (*Figure 11*). Anatomical moderate height, moderate projection 560 cc Natrelle cohesive gel, textured silicone implants (Allergan, California®, USA) were used on each side, allowing tension-free closure of skin wound. Pectoral muscle was sutured to the TIGR mesh with interrupted 3-0 PDS once the implant



Figure 6 Post mastectomy with viable nipple and healthy skin flap.

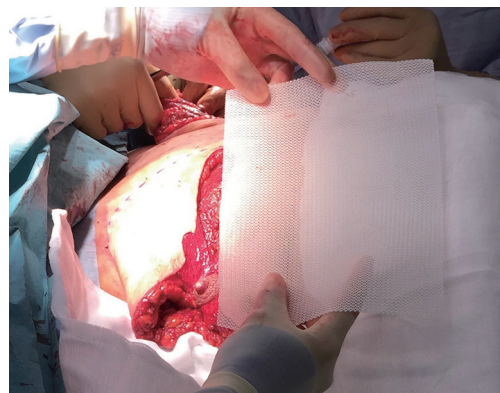


Figure 7 20 cm × 15 cm TIGR mesh.

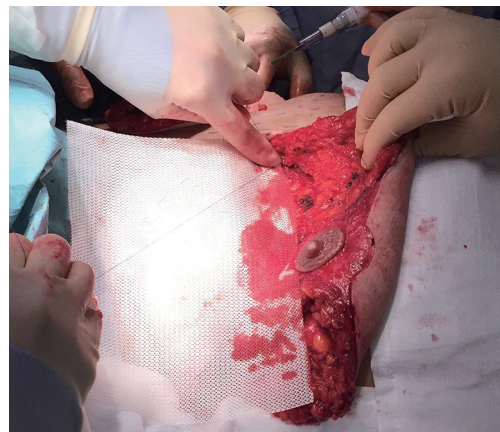


Figure 8 Edge of TIGR mesh sutured to the chest wall with interrupted PDS to recreate IMF. IMF, inframammary fold.



Figure 9 IMF marked carefully and position of each suture selected carefully to ensure smooth IMF. IMF, inframammary fold.

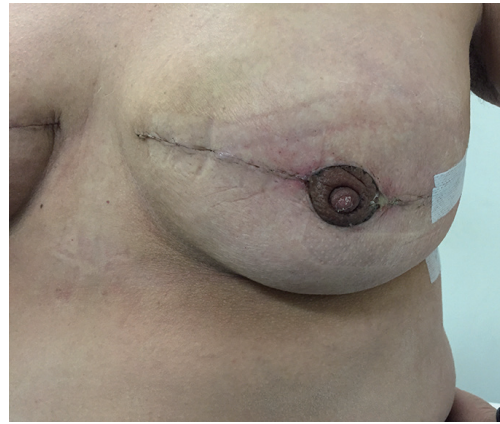


Figure 12 Minor superficial wound infection at edge of left areola bordering on lateral scar.



Figure 10 Adequate pocket created with TIGR mesh to allow coverage of lower 1/3 of implant.



Figure 13 Week 5 frontal view.

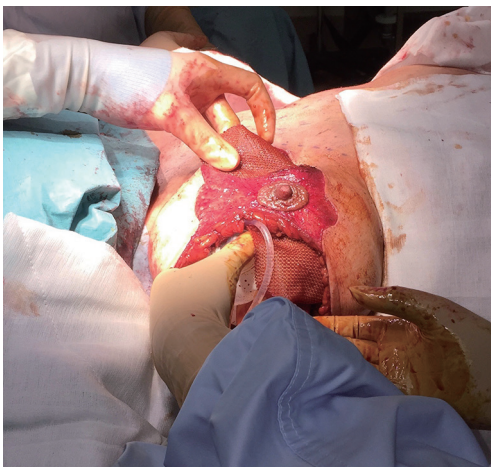


Figure 11 Sizer used to determine optimal implant volume.

was in a satisfactory position.

A single No.15 low-suction blake drain was placed under the skin flap and brought out via a separate incision in the lower axilla and secured with drain stitch on each side. Oral antibiotic was continued for the duration of the drains, which were removed on day 7 once the seroma output reduced to less than 30 mL/day.

The patient was discharged home 2 days after surgery and closely monitored by the Breast Care Nurse. On week 3, patient developed a minor wound infection at the edge of the left nipple with moderate growth of *serratia liquefaciens* and *corynebacterium* species on culture (Figure 12). Course of oral ciprofloxacin antibiotic ensured salvage of the underlying implant. High level of patient satisfaction with cosmesis achieved and good functional return to work by week 5 (Figures 13-15).



Figure 14 Week 5 right lateral view with good projection and symmetry of both IMF. IMF, inframammary fold.



Figure 15 Week 5 left lateral view.

Histology of the left breast showed 16 mm area of intermediate-grade DCIS with micropapillary and cribriform features and clear of all margins >10 mm, without any microinvasion. Additional findings of flat epithelial atypia (FEA) and proliferative features including papillary apocrine change, pseudoangiomatous stromal hyperplasia (PASH) and columnar cell change or hyperplasia were identified. There was no evidence of *in-situ* or invasive malignancy on histology of the right breast. Postoperative breast MDM discussion felt the patient had been adequately treated without the need for adjuvant therapy. She remains under active surveillance with medical oncology and the breast unit in Christchurch.

Discussion

Bi-pedicle nipple-preserving mastectomy for gynaecomastia, a modification of the Letterman technique, has been previously described (3,4). Historically, larger breasted women were offered two-stage procedure of breast reduction followed by skin-sparing mastectomy with reconstruction to achieve a final smaller-sized breast in the setting of risk-reducing mastectomy (5). Safety of skin-sparing mastectomy with ADM-assisted immediate implant reconstruction in patients with small early breast cancers and those with previous breast reduction scars has also been established (5,6). Search of medical literature including PubMed, did not identify use of the modified Letterman approach in the immediate implant reconstruction setting following mastectomy.

Potential pitfalls of nipple loss or necrosis can be circumvented by careful patient selection, avoiding in

smokers, diabetics or older patients, careful handling of skin flaps and the pedicle to avoid traction injury and ensuring closure of all wounds without tension. Intraoperatively the pedicle was thinned down to avoid ghosting effect, which could have potentially compromised vascular supply to the nipple. Special nipple dressings were left undisturbed for a week to minimize risk of wound contamination. The transparent Tegaderm dressing with a window allows visual monitoring of nipple viability by nursing staff in the immediate postoperative period while keeping the wound sealed.

Successful outcome in this case was possible due to coordinated teamwork in a multidisciplinary setting between the specialist breast radiologist, anatomical pathologist, infectious disease specialist, specialist anesthetist and an oncoplastic breast surgeon. Careful patient selection and education with multiple discussions, detailed information leaflets and close monitoring in the post-operative period by a dedicated breast care nurse is vital.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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