Mastectomy

Dayalan Clarke

Introduction:

The mastectomy has undergone changes over the last 70 years. We have moved from a radical mastectomy (Halsted's Mastectomy) in the 1950's, to a modified radical mastectomy (MRM or Patey's Mastectomy) in the 1960's and with the introduction of the sentinel node biopsy to stage the axilla, to a simple mastectomy at the turn of the century. Whilst the radical mastectomy and modified radical mastectomy include an axillary lymph node dissection, the simple mastectomy is usually performed with a sentinel node biopsy to stage the axilla and if the sentinel node is positive, the axilla is then treated with a completion lymph node dissection or more recently with axillary radiotherapy to avoid a second surgical procedure. Axillary Dissection is discussed in a separate chapter.

The radical mastectomy is an obsolete operation, so in this chapter we will discuss the ompradical mastectomy or simple mastectomy. The modified radical mastectomy is still very common in resource-limited settings; it involves a combination of mastectomy, as described here, and axillary dissection, as described in its own chapter.

The incisions for these two procedures are the same and there are two main incisions that can be used. The incisions involve removing an ellipse of skin along with the breast tissue, the nipple-areolar complex and the amount of skin removed depends on the size of the breast. The aim of a good mastectomy is to remove enough skin so there is no redundant skin on the chest wall at the end of the mastectomy, but at the same time not removing too much skin making closure of the wound difficult. One should also make sure that the entire extent of the breast tissue is removed, as leaving behind any breast tissue will increase the risk of local recurrence of the breast cancer. The steps in this chapter show how to properly remove all the breast tissue.

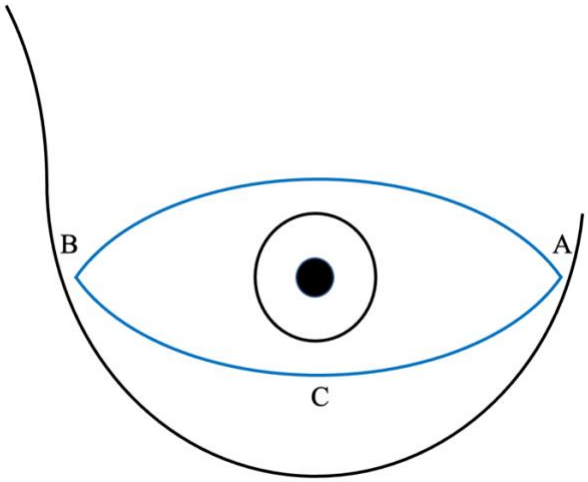
Informed consent should be obtained. The patient should be made aware of the potential complications including bleeding, infection, and seroma (collection of serous fluid in the immediate post operative period.) Complications that accompany axillary lymph node dissection include loss of sensation to the medial aspect of the upper arm and lateral aspect of the upper chest wall due to the division of the intercostobrachial nerve, shoulder stiffness and lymphedema, a long-term complication of axillary dissection that occurs months to years after the procedure.

Mastectomy proceeds in the following steps:

- Measurement of the elliptical incisions, superior and inferior
- Dissection of the superior flap
- Dissection of the breast tissue off the pectoralis major muscle
- Dissection of the inferior flap and removal of the breast tissue
- Irrigation, hemostasis, closure

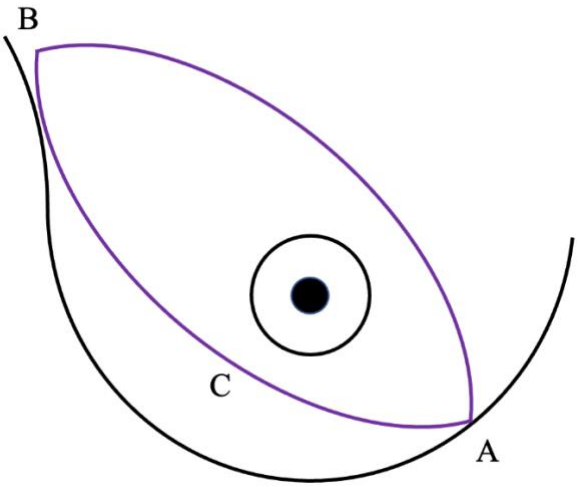
Steps:

There are 2 main incisions that will be detailed in this discussion: the horizontal ellipse and the oblique ellipse.



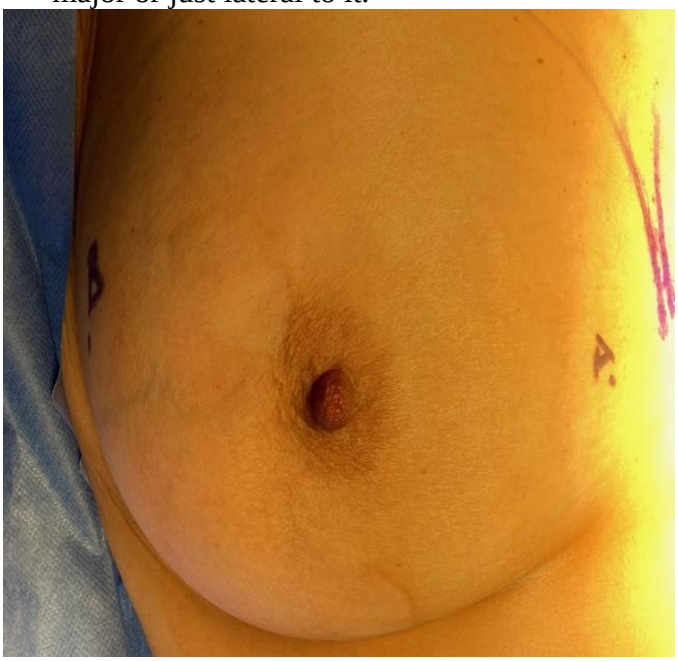
Mastectomy

Dayalan Clarke



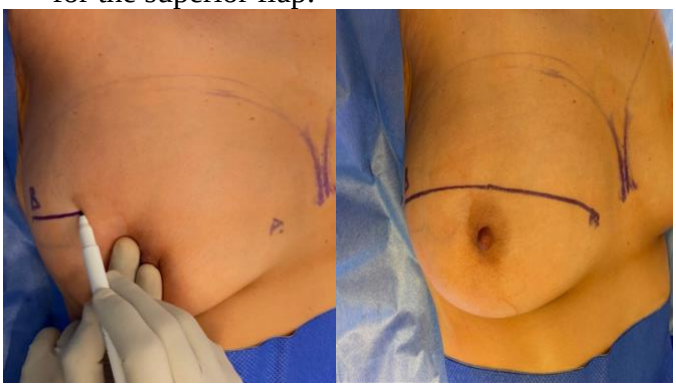
Two incisions for simple mastectomy: the horizontal (Top) and oblique (Bottom) ellipses. Both incisions allow generous access to remove all breast tissue in continuity with the nipple-areola complex. The ellipse should be large enough so that after the breast tissue is removed, the skin edges can be closed without either redundancy or tension.

1. The patient is positioned in the supine position with the arm of the mastectomy side being placed on an arm board, abducted to 90 degrees. The chest wall-arm junction should be at the edge of the table, where the surgeon will stand. The assistant stands on the same side as the surgeon and above the abducted arm.
2. The breast, axilla and the upper arm are prepared and draped. One does not have to prepare and drape the upper arm in a way that the arm can be mobilized during surgery, though some surgeons may prefer to do this.
3. The ellipse of the skin incision is marked on the breast. For the horizontal ellipse mastectomy, two points A and B are first marked on the breast with a sterile marking pen. Point A is the medial extent of the ellipse and is placed at the level of the nipple 1 to 2cms lateral to the midline. Point B is the lateral extent of the ellipse, and the placement of this point will differ depending on whether one is planning a horizontal ellipse or an oblique ellipse. Point B should not extend too far laterally and should not extend beyond the midaxillary line. The further lateral one extends point B, the more likely one is to end up with a "dog ear" at the lateral extent. For a horizontal ellipse, Point B is marked at the same horizontal level as point A. For an oblique ellipse, Point A is marked medially, a few centimeters below the level of the nipple and point B is placed close to the axilla, on the lateral border of the pectoralis major or just lateral to it.



Point A is chosen first, at the level of the nipple about 2cm lateral to the midline of the chest. Point B is then chosen opposite Point A, creating a horizontal or oblique ellipse.

4. For both the horizontal and oblique ellipse mastectomies, the breast is pulled down with one hand and the points A and B are connected by a gentle convex ellipse which marks the incision for the superior flap.

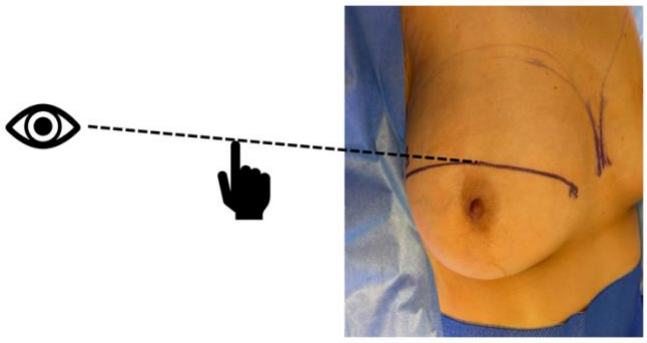


Pull the nipple downwards gently and make a convex line that connects the two points.

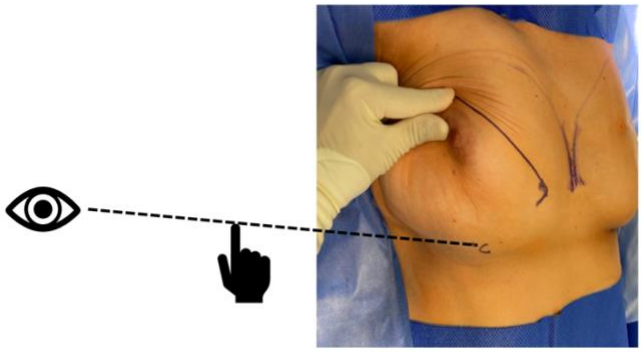
Mastectomy

Dayalan Clarke

The inferior incision of the ellipse is marked by now pulling the breast upwards and connecting points A and B by a concave ellipse through point C. The level at which the inferior elliptical incision is marked (point C) is determined by the "parallax" method. For this the surgeon holds a marking pen or raised index finger halfway between their eyeline and the breast. The breast is gently pulled downwards so the upper curve of the elliptical incision is in line with the marking pen and the surgeon's eye. With the pen or finger held at this level, the breast is now gently pulled upwards towards the patient's head and the point where the pen lies on the inferior aspect of the breast is now marked on the breast – point C. This point is used as the lower level of the inferior ellipse, to connect points A and B with a gentle concavity downwards.

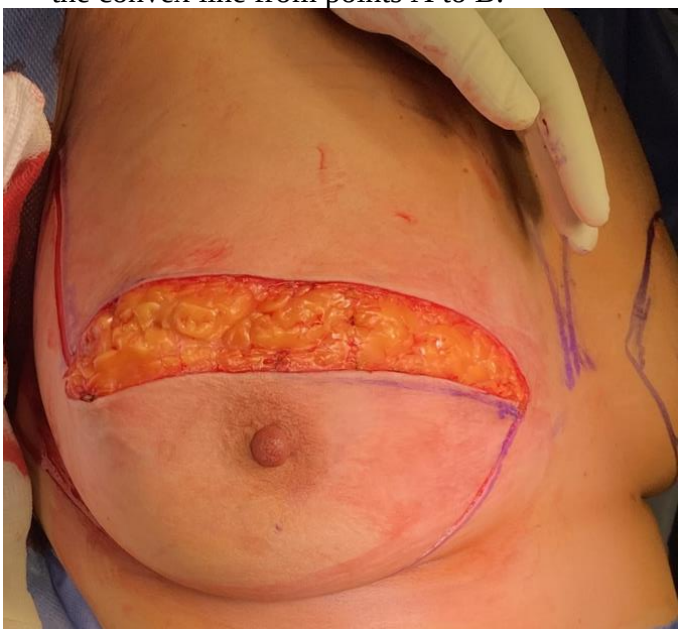


With an elevated pen or finger (shown,) mark a point at the middle of the ellipse.



Without moving your head or finger, grasp the nipple and gently pull it upwards. The point where your finger shows you on the inferior aspect of the breast is Point C, the lowest extent of the inferior ellipse.

5. Once the incisions have been marked on the skin, the superior incision is made with a scalpel along the convex line from points A to B.

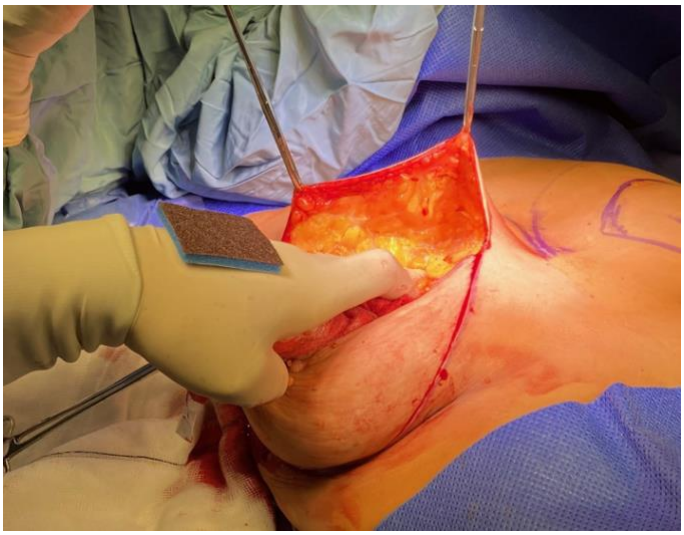


An incision is made along the superior ellipse through the skin to the subcutaneous tissue.

6. The incision is deepened with the scalpel or diathermy to go through the subcutaneous fat until the layer of the superficial fascia. The white strands of the superficial fascia are easily identified. The raising of the mastectomy flaps is now carried out in this plane between the superficial fascia and the breast parenchyma. This is normally a well-defined plane which is relatively avascular. Once this plane is reached, either skin hooks, cats paw retractors or Allis/Littlewoods clamps are used to retract the superior skin flap. If using Allis/Littlewoods, make sure these are placed only on the dermis or deeper. Penetrating towel clips are also acceptable.

Mastectomy

Dayalan Clarke



The assistant provides counter-traction with the instruments. The surgeon applies traction with the non-dominant hand and opens the plane between the subcutaneous fat and the breast tissue.

7. The adequate retraction of this superior skin flap by the assistant is crucial to an easy and blood free dissection. Like all surgical dissections, the success of raising the flaps in a mastectomy depends on adequate traction applied by the assistant and counter traction applied by the surgeon. The assistant should retract the skin flap upwards towards the operating room ceiling rather than towards the head of the patient. While the assistant is retracting the skin flap towards the ceiling, the surgeon retracts the breast with his left hand inferiorly towards the patient's feet. This traction and counter traction should open the plane between the superficial fascia and the breast parenchyma, to allow an easy and avascular plane to carry out this dissection.

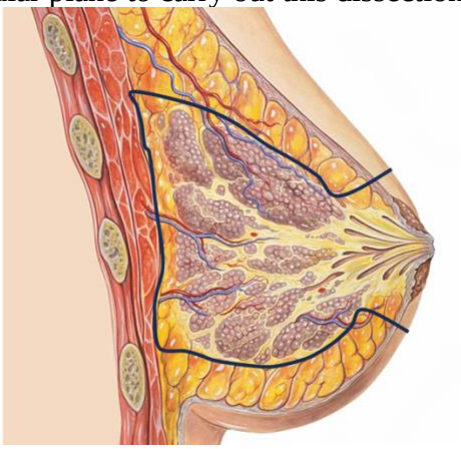
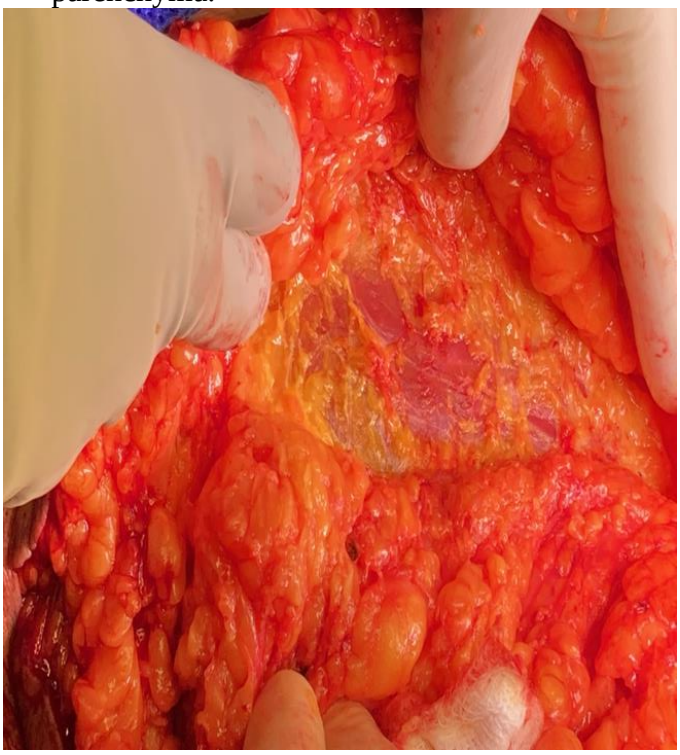


Illustration of the plane followed during mastectomy. The skin and subcutaneous tissue are retracted away from the breast tissue and preserved. Contrary to this illustration, the color of breast tissue is very similar to that of subcutaneous fat. Careful retraction and meticulous technique is needed to find this plane. Source: Andrewmeyerson, CC BY-SA 3.0 via Wikimedia Commons

8. The dissection of the superior flap is continued superiorly till the dissection reaches the fibers of the pectorals major above and beyond the breast parenchyma.

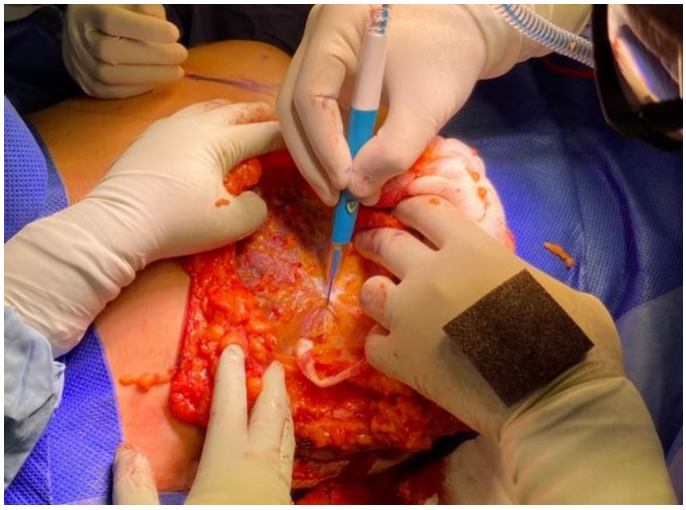


The endpoint of the superior flap dissection is the pectoralis major muscle. As seen here, the assistant's retraction of the skin is countered by the surgeon's non-dominant hand pulling the breast tissue downwards.

9. Once the pectoralis major fibers are reached superiorly, the breast parenchyma is dissected off the pectoralis major from medial to lateral. This is a well-defined avascular plane. If the surgeon retracts the breast adequately, it should dissect away from the pectoralis muscle with minimal bleeding.

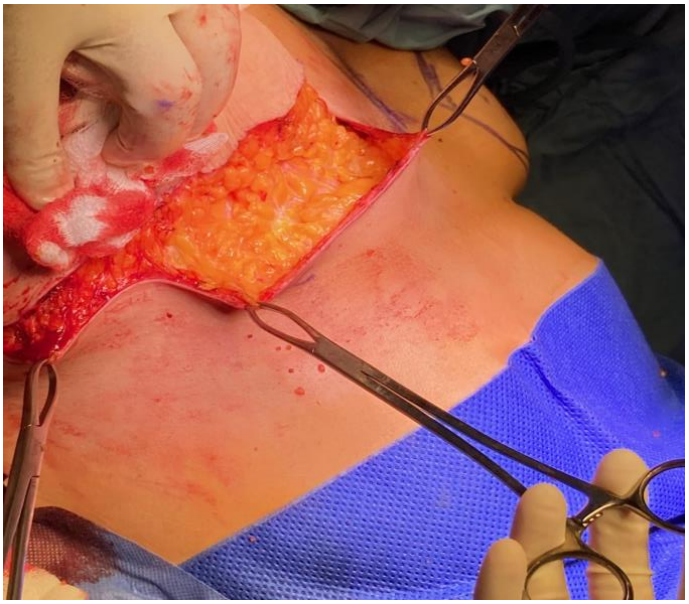
Mastectomy

Dayalan Clarke



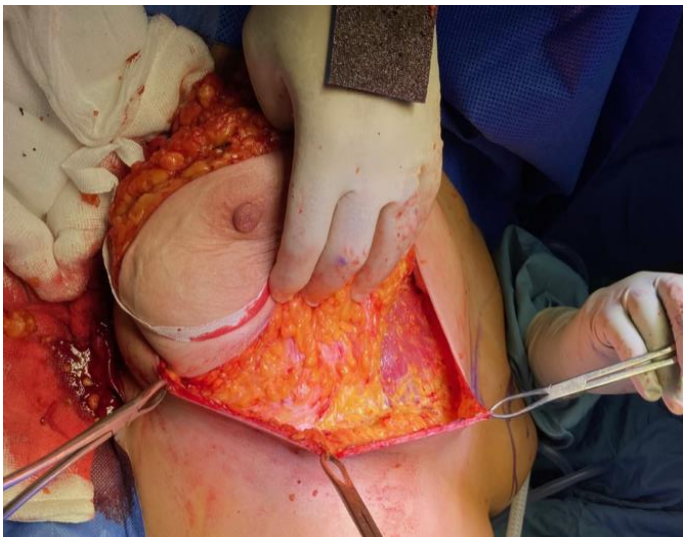
With proper retraction, the breast tissue can be dissected off the anterior surface of the pectoralis major muscle.

10. The breast is dissected off the pectoralis major muscle as far as the level of the inframammary crease if possible. Once this is done, the surgeon may prefer to swap places with the assistant for the dissection of the inferior flap.
11. The skin incision for the inferior flap is now made as marked previously. Before making the inferior flap incision, check that the edge of the superior flap will meet the inferior incision without any tension. If this appears difficult, the skin incision of the inferior flap can be revised to reduce the tension of the closure.



The inferior flap dissection is done in the same way that the superior one was, with the assistant providing counter-traction on the skin and the surgeon's non-dominant hand pulling the breast tissue in a cranial direction.

12. The inferior flap skin incision is deepened through the subcutaneous fat and superficial fascia. Again, with traction and counter traction this plane is developed and dissected till one reaches the inframammary crease. As with the superior flap dissection reaches the pectoralis major muscle, this dissection reaches the chest/anterior abdominal wall.

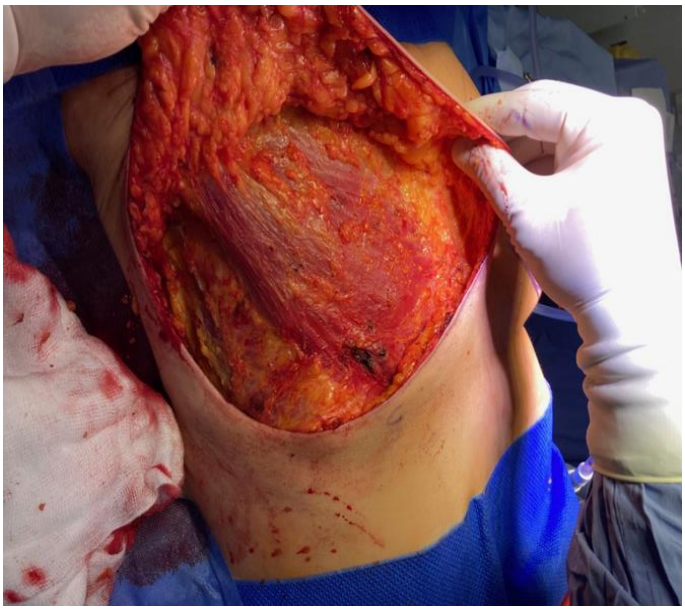


As before, the dissection of the inferior flap is complete when the muscle fibers of the pectoralis major muscle are reached.

13. The dissection for the inferior aspect is again carried out at this level from point A to point B.
14. Starting from point A, the breast is now removed from the chest wall starting medially and finishing laterally to include the axillary tail for a simple mastectomy.
15. For an axillary dissection the dissection carries on en-bloc into the axilla. You may extend the incision from the lateral tip of the ellipse, Point B, to the anterior border of the latissimus dorsi for better access to the axilla.
16. Once the breast is removed, its orientation is marked with sutures for the pathologist to accurately assess the margins.
17. The cavity is washed out with Normal Saline and adequate hemostasis is achieved with diathermy.

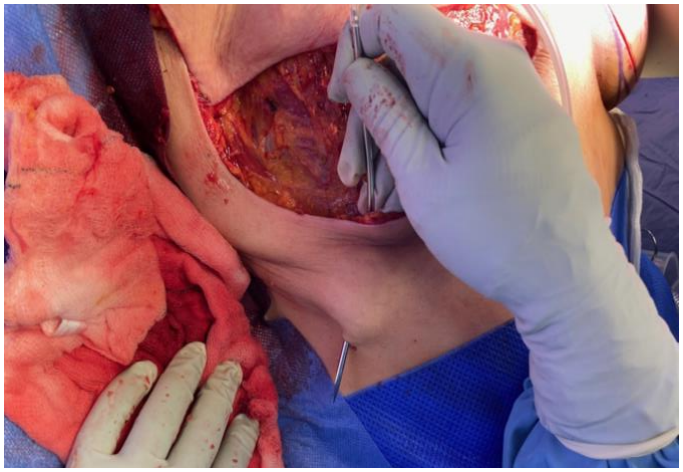
Mastectomy

Dayalan Clarke



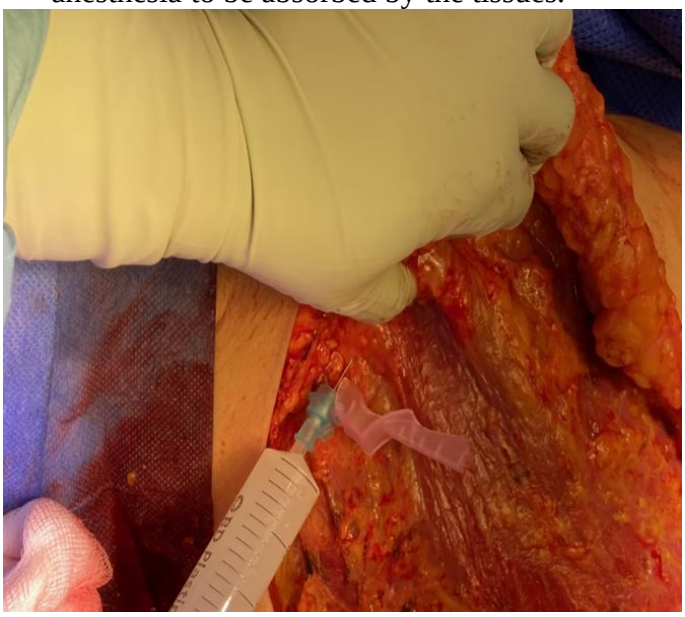
Appearance of the cavity after removal of the breast and achievement of hemostasis.

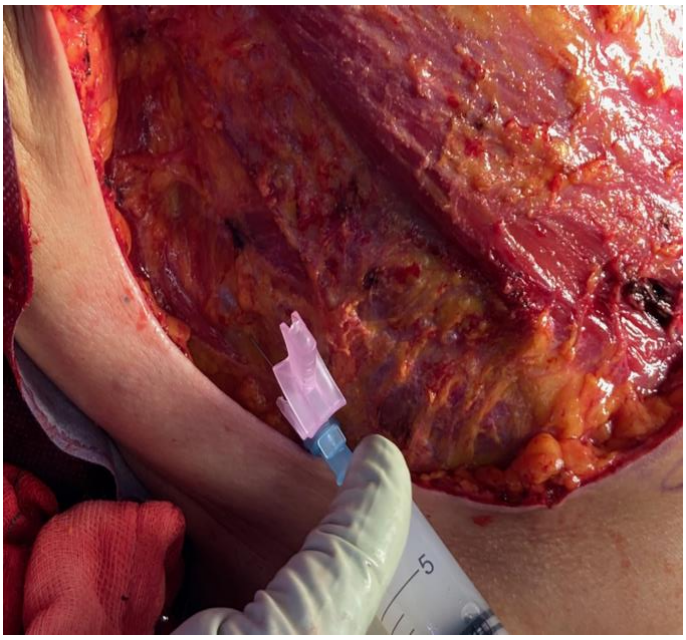
18. Once adequate hemostasis is achieved a low suction drain size 10 or 14 is placed in the cavity and sutured to the skin.



A drain is passed through a separate incision in the skin, in this case with a provided trocar.

19. The administration of a local anesthetic agent is strongly recommended for post operative analgesia, according to standard dosing. 10mls of this is administered as an interpectoral block administered between the pectoralis major and pectoralis minor, and 10mls as a serratus block injected at the superior border of the serratus muscle before closure, under direct vision. The remaining 20mls is injected into the drain after closure of the wound. If local anesthetic is injected into the drain, do not connect the drain to suction for 30 minutes to allow for the local anesthesia to be absorbed by the tissues.

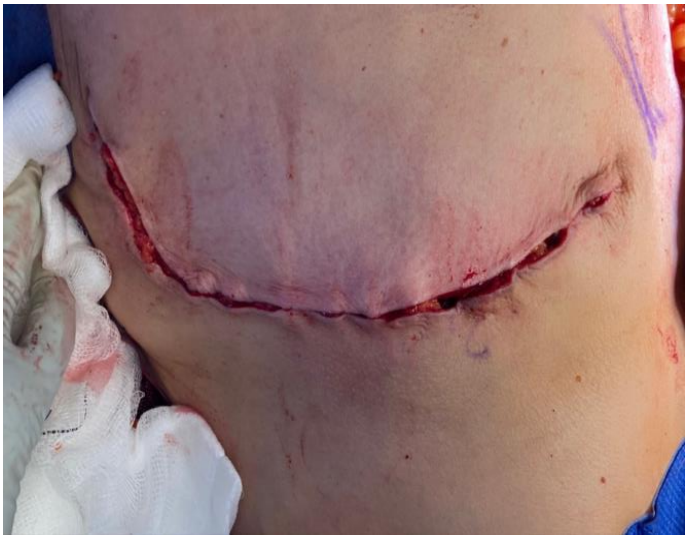




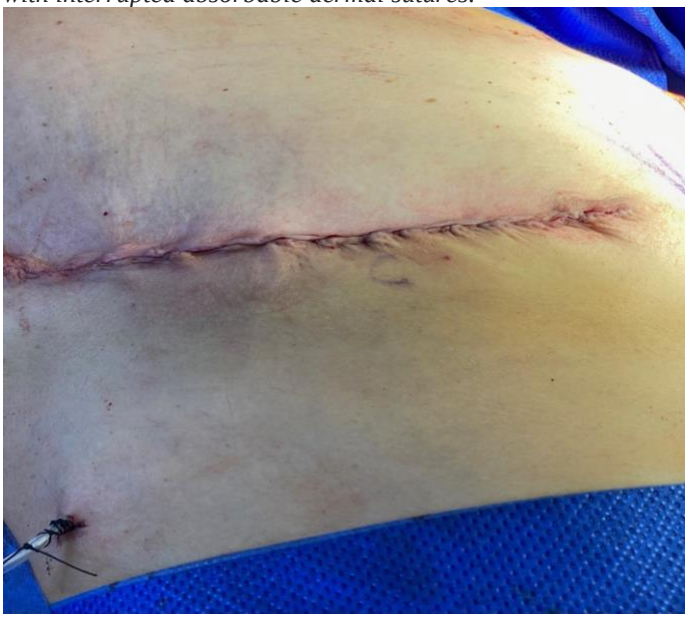
Injection of local anesthetic into the anterior border of the serratus anterior muscle. If axillary dissection was not performed, this structure will not be visible.

20. The mastectomy wound is closed in 2 layers. The first layer is 3-0 interrupted absorbable dermal stitches (such as Vicryl or PDS) followed by a

continuous subcuticular suture of 3-0 or 4-0 absorbable monofilament suture.



The appearance of the wound after the first layer of closure, with interrupted absorbable dermal sutures.



Appearance of the wound after subcuticular closure.

21. This is followed by Steri-Strips and a sterile occlusive dressing.

Pitfalls

- A seroma is a common complication of this operation, whether a drain is left or not. It is easily dealt with in the clinic by serial aspiration until the seroma does not recur. Follow strict sterile technique when aspirating the seroma, to prevent a secondary infection.
- Failure to close the wound: miscalculation on the surgeon's part can result in two wound edges that cannot be brought together at the end of the operation. This complication is better prevented than treated, by following the steps outlined above. If the tumor is mobile, grasp it, elevate it away from the chest wall, and visualize where the elliptical skin incisions must be made in order for the skin to come together. If you find that the skin cannot be closed after mastectomy, try undermining the tissue farther in a cranial and caudal direction. If this still does not work, an inelegant but effective solution to this problem is a split-thickness skin graft to close the wound, either immediate or delayed.
- Wound infection: this is unusual, but may require opening the wound widely, as there is a cavity underneath.

Dayalan Clarke MS, MD, FRCS(Ed)
South Warwickshire NHS Foundation Trust
Warwick, United Kingdom

June 2023