Seroma after breast surgey

Essay

Submitted for the partial fulfillment of master degree

In General Surgery

By

Mostafa Mohammed Elsayed
M.B.B.Ch., Zagazig University 2003

Supervised By

Prof. Dr. Ibrahim Shamekh Mohamed
Professor of General Surgery – Breast Surgery
Faculty of medicine- Ain Shams University

Dr. Mohammed Hamdy Hamouda
Assistant Professor of General Surgery
Faculty of medicine- Ain Shams University

Dr. Mohamed Elsayed Elshinawi
Lecturer of General Surgery
Faculty of medicine- Ain Shams University

Faculty of medicine
Ain Shams university
2009

List of contents

Introduction

Seroma in general is defined as a fluid collection subcutaneously after some operations in which there is a large dead space, seroma formation commonly expected after mastectomy in which flaps are widely dissected **(Velanovich, 2001)**.

Recent studies about the nature of seroma say that seroma fluid is an element of acute inflammatory response as the fluid contains immunoglobulins and white blood cells **(Pagson et al., 2003).** It concluded that the fluid nature was inflammatory exudates and contains a mix of white blood cells with great number of granulocytes and monocytes which are the components of the inflammatory response in the first phase of wound healing. So it is not a serum as the fluid contains neither blood cells nor pure lymph in nature as the fluid contains a greater number of granulocytes and monocytes than lymphocytes and a higher content of albumin, calcium and cholesterole than lymph **(Pagson et al, 2003).**

Many factors are claimed to be a cause of incidence increase of seroma after breast surgery including increased patient age, increased breast size, increased patient weight, previous surgical biopsy, history of smoking, certain diseases may be claimed as diabetes mellitus and hypertension , presence of malignant axillary lymph nodes and their number, tumor grading and staging **(Kumar et al, 1995)**.

Other factors which play the major role in seroma development are those related to the surgery as, the surgical site, post mastectomy seroma is the most common type followed by abdominal seroma **(Clark et al., 2005).**

The use of electrocautery to raise breast flaps and excise the breast and pectoral fascia leads to decrease blood loss and lowers transfusion requirements but increases the incidence of wound complications like cellulites , infection , flap necrosis and seroma formation. The seroma formation incidence is about 30% with electrocautery and 9% in scalpel dissection **(Kathaleen et al., 1998)**.

Drains are an important in the elimination of any undesired substances from the spaces that created by a surgical operation. Drain removal is a matter of controversies, the most accepted time is after daily drainge of 30cc on at least two consecutive days **(Aaron et al., 2001)**.

Intraoperative placement of the MammoSite catheter for accelerated partial breast irradiation is associated with a high rate of clinically detectable seroma that adversely affects the cosmetic outcome **(Evans SB., et al, 2004)**.

Post operative shoulder joint dysfunction is a frequent postmastectomy complication. In order to prevent such a complication shoulder exercises have been recommended, however, this practice may itself be a cause of seroma formation **(Gratodour et al., 1999)**.

Seroma formation increases the risk of post operative complications, delays wound healing, personal discomfort to the patient, Prolongs convalescence unnecessarily, increases susceptibility to infection, Skin flap necrosis, persistent pain and wound dehiscence. Other complications which may occure with long standing persistent seroma as fibrous capsule formation around the seroma fluid which should be surgically evacuated, atypical cells may be present in long standing persistent cases **(William E. Stehben, 2003)**.

Seroma is verified by clinical examination as a swelling which is detected below the ipsilateral axilla, skin flaps and breast after conservative surgery with flactuation. Ultrasonography and mammography can play role in follow up of seroma **(William E. Stehben, 2003)**.

We can get the least incidence of seroma formation with the use of harmonic scalpel in dissection and hemostasis, closure of dead spaces surgically by buttress or taking sutures and chemically with fibrin glue, application of early post operative pressure garment and avoiding early postoperative shoulder joint exercise ***(Shukla et al., 2001).***

Modified radical mastectomy remains the most commonly performed breast cancer surgery today. Conservative surgical treatment has replaced mastectomy in the treatment of many breast cancers in the first clinical stage. This treatment introduces the risk of local recurrences, which should always be

prevented by radiotherapy. These are usually combined with axillary surgery usually through a separate axillary incision **(Pourquier, 2000).**

Conventional surgery using scalpel and electrocautery is associated with moderate blood loss, haematoma, flap necrosis and seroma ***(Hoenig et al., 2003).***

Studies have shown that the thermal injury with harmonic scalpel is less in comparison to electrocautery. The harmonic scalpel causes breakdown of hydrogen bond and forms a protein coagulum to occlude the vascular and lymphatic channels ***(Hoenig et al., 2003).***

Treatment of seroma by frequent daily aspiration or by the application of seroma catheter wound drainge. Surgical excision is necessary in chronic resistant cases with fibrous capsule formation ***(Webster et al., 2001).***

Aim of work

The aim of this work is to study the postoperative seroma after breast surgery as regarding pathogenesis, diagnosis and different modalities in prevention and treatment of this type of morbidity.

BREAST ANATOMY

The female breast extends from the 2nd rib above to the 6th rib below. It reaches the edge of the sternum medially and not beyond the midaxillary line laterally. It lies on the pectoralis major fascia superomedially and the serratus anterior fascia inferolaterally. It has an extension into the axilla called the axillary tail or (Tail of Spence) ***(Aston, et al., 1997).***

Breast development:

I-Prenatal development :

Prenatal development is similar in both sexes, with epithelial mammary bud appearing at a gestational age of 35 days, by day 37 this has become a mammary line extending from axilla through to the inguinal region. Usually invagination of the thoracic mammary bud into mesenchyme occurs by day 49, with involution of remaining mammary line. Accessory breast tissue may be present in adult anywhere along milk line (polythelia). Nipple formation begins at day 56 and primitive ducts (mammary spronts) develop at 84 days with canalization occurring at about the 150th day ***(Williams, et al., 1995).***

The absence of the testosterone hormone or its receptors allow female breast development to proceed. Conversely the presence of testosterone hormone in the male fetus induces rapid mesenchymal proliferation and effectively, (Strangles) the epidermal spruts and obviates further breast development ***(Georgiade, 1997).***

II-Postnatal development:

Lobule formation occurs (exclusively in females) after puberty when there is branching of ducts and development of lobules from terminal ducts**.** Externally recognizable breast development from puberty onwards can be divided into 5 separate phases**.** In **phase1:** there is elevation of nipple**.** In **phase2:** glandular subareolar tissue is present with both nipple and breast projection from the chest wall as a single mass**. Phase3:** encompasses increase in diameter and pigmentation of the areola, with proliferation of palpable breast tissue**.** During **phase4:** there is further pigmentation and enlargement of the nipple and areola so that the nipple and areola form a secondary mass anterior to the main part of the breast**.** Finally, **phase5:** there is development of smooth contour of the breast ***(Williams, et al., 1995).***

Female breast structure:

The breast made up of 15-20 lobules of glandular tissue embedded in fat and are separated by fibrous septae running from subcutaneous tissues to the fascia of the chest wall (The ligaments of Cooper)**.** Each lobule drains by its lactiferous duct on the nipple which is surrounded by areola ***(Ellis, 2002).***

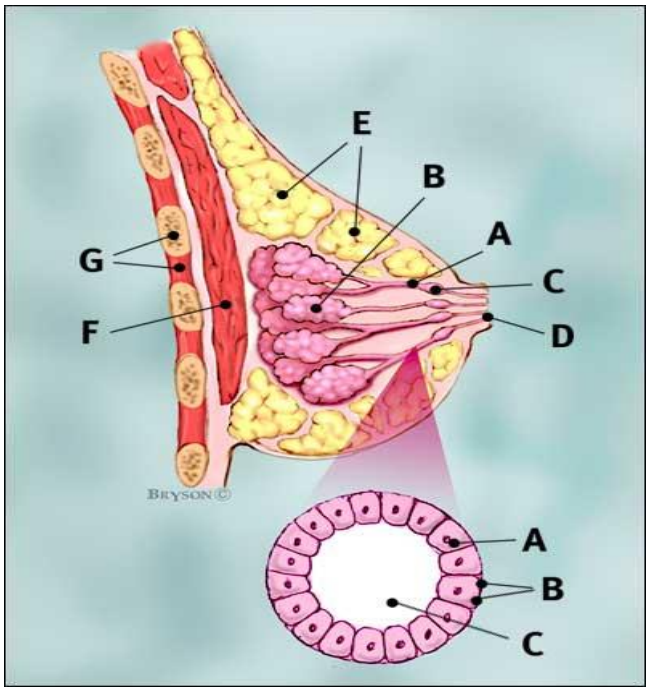

Fig.(1-1): Breast profile:

A: ducts B: lobules

C: dilated section of duct to hold milk

D: nipple E: fat

F: pectoralis major muscle G: chest wall/rib cage

(Weiss, et al.2006).

Nipple areola complex (N A C) :

The nipple is free of fat**.** It contains circular and longitudinal muscle fiber ,that erect or flatten it respectively. The areola is normally pigmented, and it

is the circular area around the nipple. It contains apocrine sweat and sebaceous glands. The Tubercles of Morgagni are elevations at the gland openings. Montgomery glands are located at its periphery and are capable of secreting milk ***(Romanes,1993).***

Male breast :

Male breast remains rudimentary throughout life. It is formed of small ducts (without lobules or alveoli) and a little supporting fibro-adipose tissue sometimes the ducts are largely solid cellular cords. Slight temporary enlargement may occur at puberty. The areola is well developed, although limited in area, and the nipple is relatively small ***(Williams, et al., 1995).***

Blood supply of the breast:

Arterial supply:

Blood supply to the breast is from multiple sources:

1-The internal mammary artery which arises from first part of subclavian artery ,gives perforating branches (most notably the second to fifth perforators) supply the breast,

2-The thoracoacromial artery: it is a short branch of second part of the axillary artery. ,

3-The lateral thoracic artery: from second part of axillary artery

4-The terminal branches of the third to eighth intercostal vessels and the vessels to serratus anterior.

The internal mammary vessels accounts for 60% of the total breast blood supply. The lateral thoracic supply contributes about 30% of total breast

vascularity ***(Jones, 2006).***

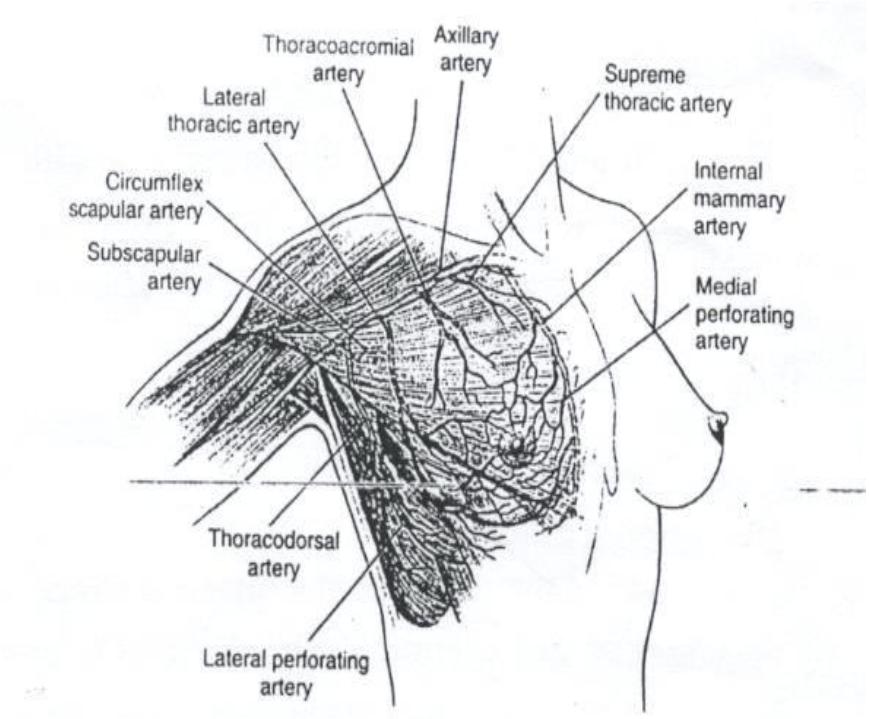

Fig.(1-2): Arterial supply of the pectoral region **(Sparatt, et al., 2002).**

The medial breast portion receives from the branches of the internal thoracic artery , especially in the 2nd and 3rd intercostal spaces**.** The lateral part is

supplied by the lateral thoracic artery. Inferiorly, it is supplied by the anterior intercostal arteries, especially in the 4th and 5th intercostal spaces. The superior portion receives perforators of the supra-clavicular and the thoracoacromial arteries. These vessels anastomose below the NAC, then follow the connective tissue framework to penetrate the gland ***(Corduff and Taylor, 2003).***

Venous drainage:

The venous drainage of the breast is divided into two systems the superficial and the deep system. The venous drainage of the breast is important not only because of the route of hematogenous metastatic spread from carcinomas, but also because of the lymphatic vessels generally follows the same course ***(Haagensen, 1986).***

A)The superficial venous system:

The superficial veins lies just deep to the superficial fascia . The superficial and deep veins anastomose with each other through the mammary gland and it may anastomose crossing the midline ***(Herniques , 1982).***

B)The deep venous system:

Venous drainage is mainly by deep veins that run with the main arteries to internal thoracic, axillary, subclavian veins and azygous system via the

intercostal veins**.** The posterior intercostal veins anastemosis with the vertebral veins provides an important link and hence a pathway for metastatic spread to the bone ***(Mc Minn, 1994).***

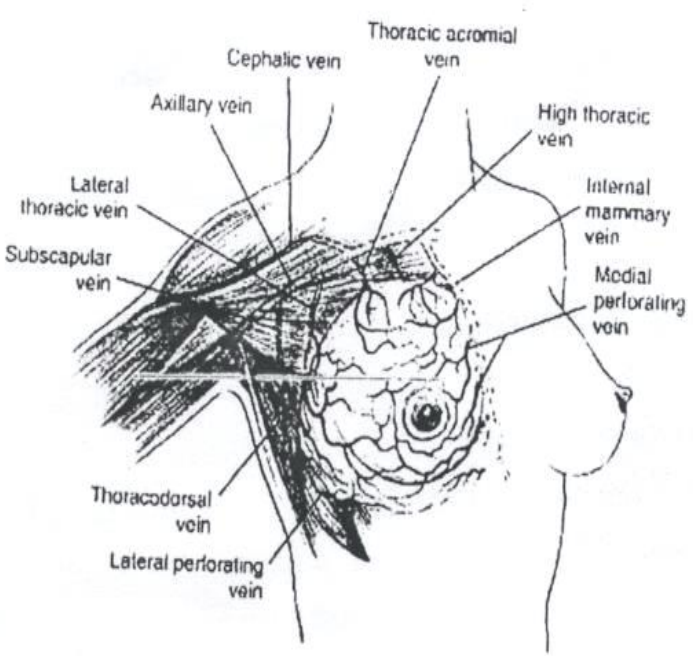

Fig.(1-3): Venous drainage of the breast **(Sparatt, et al., 2002).**

Nerve supply to the breast:

The second to sixth intercostal nerves supply breast innervation. Lateral innervation is predominantly from the anterior rami of lateral

cutaneous branches of the third through sixth intercostal nerves. Medial innervation arises from the anterior cutaneous branches of the second through sixth intercostal nerves. Nerve supply to the nipple is from the third, fourth, and fifth anterior and lateral cutaneous nerves. The fourth intercostal nerve is the most important nipple innervator ***(Jones, 2006).***

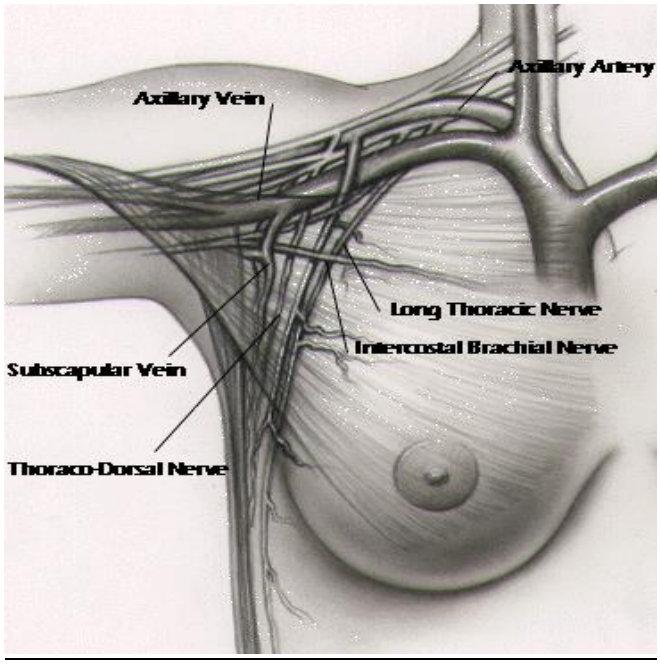

Fig.(1-4): Nerve supply of the breast **(Weiss, et al.2006).**

Lymphatic Drainage:

Current understanding of the lymphatic system of the breast is derived mainly from the work of the anatomist Sappey in the 1850s ***(H. Suami, et al., 2007).***