Chirurgia (2024) 119: 440-444
No. 4, July - August
Copyright© Celsius
http://dx.doi.org/10.21614/chirurgia.3021

The Banaras Convention: A Safe & Reliable Technique for Axillary Dissection by Lateral exposure of Latissimus Dorsi Pedicle

Mayank Tripathi, Kumar Vineet*, Piyush K. Shukla, Ravinder Kumar, Nitesh Joshi, Neha Mishra

Department of Surgical Oncology, MPMMCC & HBCH, Varanasi, India

*Corresponding author:
Dr. Kumar Vineet
Department of Surgical Oncology
MPMMCC & HBCH, Varanasi, India
Phone numbers- 8127173601
E-mail: likho2vineet@gmail.com
Orcid id- 0000-0002-8077-1299

Abbreviations:
BC: Breast cancer;
LD: Latissimus dorsi,
NACT: Neoadjuvant chemotherapy;
MPP: Medial pectoral pedicle;
ICBN: Intercostobrachial nerve.

Rezumat

Cancerul de sân este în creştere în rândul femeilor din India. Majoritatea cazurilor sunt prezentate în stadiul avansat local, unde este necesară disecția axilară. În acest articol, am descris abordarea noastră a disecției axilare în axilele dificile din punct de vedere tehnic cu sarcină nodală mare.

Cuvinte cheie: spatele cel mai lat, axilă, expunere laterală

Abstract

Breast cancer is rising among women in India. Most of the cases are presented at the locally advanced stage where axillary dissection is needed. In this article, we have described our approach of axillary dissection in the technically challenging high nodal burden axillas.

Key words: latissimus dorsi, axilla, lateral exposure

Introduction

Breast cancer (BC) is the most common type of cancer in women with a steady rise in its incidence in the last 4 decades (1). There were around 2.3 million new cases in 2020 and it is

Received: 03.07.2024
Accepted: 23.08.2024

expected to reach 4.4 million cases by 2070. In 2020, its incidence surpassed lung cancer as the most common type of cancer worldwide (2). According to GLOBOCAN 2020 data, BC accounts for 13.5 % of all cancer cases in India i.e. roughly around 1,80,000 new cases (3).

Despite a paradigm shift in the management of BC, surgery of the breast and axilla remains the cornerstone of treatment for non-metastatic BC as shown in NSABP B-04, B-06, B-17 & B-32 trials (4). Long term follow up of NSABP B-06, MILAN trial along with recent ACOSOG Z0011 and Z1071 trials have demonstrated that BC surgery has evolved significantly from the Halstedian era to the current practice of breast conservation and axillary de-escalation (5-8). However, in developing regions like India and other Southeast Asian countries, the incidence of locally advanced BC remains high, ranging from 38-47% (9). Consequently, modified radical mastectomy with axillary dissection continues to be widely practiced.

In this paper, we have described our technique for safe axillary dissection with lateral exposure of the latissimus dorsi (LD) pedicle in patients with a heavy nodal burden, even after neoadjuvant chemotherapy (NACT), and in patients with high BMI and fatty axillae. This technique is applicable to both mastectomy and breast conservation procedures.

Surgical Technique

Patient Positioning

The patient is positioned supine at the lateral edge of the table with the arm abducted to 90 degrees, ensuring adequate padding under the arm. Proper arm positioning is crucial to maintain the anatomical arrangement of important structures in the axilla. Over-abducting or under-abducting the arm can alter the anatomical orientation and hinder the surgical procedure.

Axillary Dissection Template

We recommend using a good monopolar and bipolar diathermy machine during this procedure to ensure precise dissection and hemostasis. Axillary nodal stations are divided into three levels viz. Level 1 nodes are those lying inferior and lateral to the pectoralis minor muscle, level 2 are stationed behind the pectoralis minor while level 3 or apical nodes are those lying medial to the pectoralis minor.

The anatomical boundaries for level 1 axillary clearance are axillary vein superiorly, angular vein inferiorly , lateral border of latissimus dorsi muscle laterally and medially the chest wall. The base of the axillary dissection template is formed by the subscapularis and latissimus dorsi muscles. We consciously avoid removing fibrofatty tissues beyond the lateral border of the axillary vein to prevent significant upper limb lymphedema.

Steps

1. The dissection begins by incising the clavipectoral fascia along the lateral border of the pectoralis minor muscle to expose the medial pectoral pedicle (MPP) (*Fig. 1*).
   Any injury to the MPP and the accompanying medial pectoral nerve can lead to

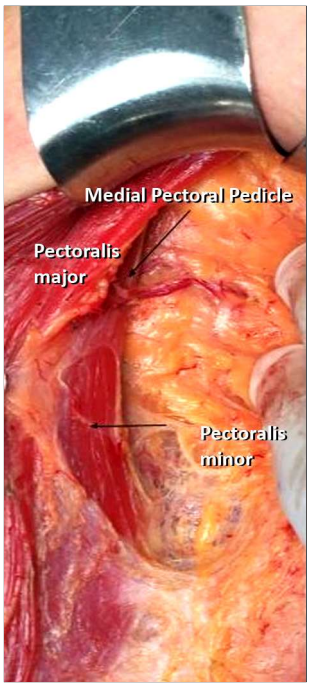

Figure 1. Medial pectoral pedicle exposed on lateral border of pectoralis minor muscle

wasting of the pectoralis major muscle, resulting in shoulder dysfunction and loss of contour of the chest wall.

2. After identifying the MPP, we use bipolar diathermy to dissect the fat around it. There are typically one or two venous tributaries from the MPP to the axillary fat that need to be clipped or cauterized with the bipolar diathermy.
   Any injury to these small branches can lead to bleeding and subsequent injury to the MPP while attempting hemostasis.
   The MPP forms a loop at the lateral border of the pectoralis minor, serving as an anatomical landmark to identify the axillary vein, which is approximately 1.5 cm cranial, and the intercostobrachial nerve, which is around 1.5 cm caudal.
3. We further incise the clavipectoral fascia superiorly and along the axillary vein, 1.5-2 cm cranial to the MPP loop, to expose the entire course of the axillary vein in the axilla.
   Traditionally, the next step in axillary dissection is to identify the LD pedicle deep to the axillary vein by dissecting all the fibrofatty tissue from the lower border of the axillary vein. In doing so, we encounter a large tributary to the axillary vein from the axillary fat, superficial to the LD pedicle, which needs to be ligated to expose the LD pedicle. In cases of breast cancer with significant nodal burden and in patients with high BMI, exposure of the LD pedicle is difficult through this traditional approach and may lead to bleeding and injury to the LD pedicle.
   In our technique, we follow the lateral exposure of the LD pedicle along its entire length. After exposing the axillary vein, we shift our attention laterally.
4. We expose the lateral border of the latissimus dorsi muscle and lift all the fibrofatty tissue along the latissimus dorsi superomedially using a bipolar diathermy. While doing so, we encounter the insertion of the LD pedicle into the latissimus dorsi muscle. The LD pedicle is then traced superiorly by dissecting all the fibrofatty tissue along its course until we reach the insertion of the LD pedicle vein (thoracodorsal vein) into the axillary vein (*Fig. 2*).
   Beyond this point, the thoracodorsal nerve runs parallel to the axillary vein before it joins the posterior cord of the brachial plexus superiorly.
   Dissection along the LD pedicle is either performed using bipolar diathermy or sharp scissors. Once the LD pedicle is identified along its entire course to its insertion into the axillary vein, we reflect all fibrofatty tissue medially, with ligation of the axillary vein tributary superficial to the LD pedicle.
   Notably, the nerve to the serratus anterior lies in the same horizontal plane as the LD pedicle, medially along the chest wall, and deep to the intercostobrachial nerve (ICBN).
5. We identify the ICBN 1-1.5 cm caudal to the MPP loop and divide it with scissors close to the chest wall. Further dissection along the chest wall deep to the ICBN reveals the long thoracic nerve, enveloped in a thin fascia (*Fig. 3*). This nerve is often

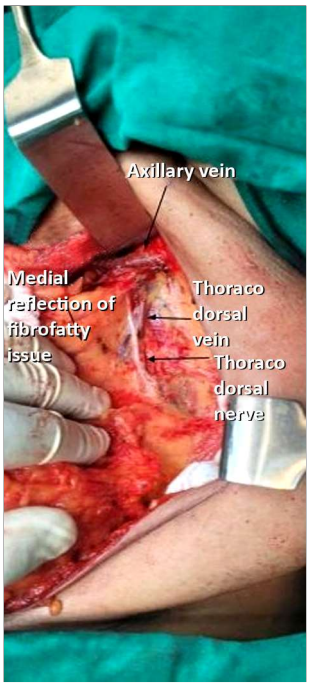

Figure 2. Exposure of latissimus dorsi pedicle and medial reflection of fibrofatty tissues

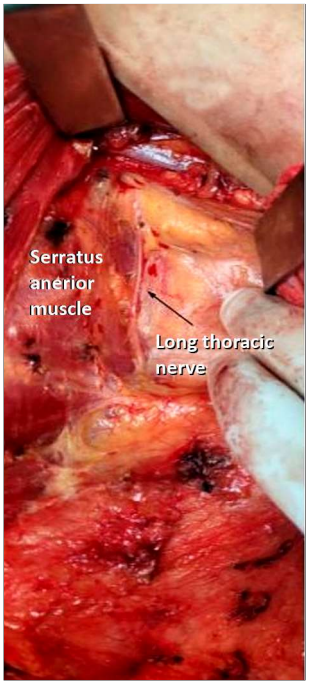

Figure 3. Exposure of long thoracic nerve

accompanied by a small vein, which typically requires a touch of bipolar diathermy before dissecting the nerve along the chest wall.

The long thoracic nerve runs down and pierces the serratus anterior muscle at the junction of the superior two-thirds and lower one-third of the serratus anterior muscle.

At the point where the long thoracic nerve enters the muscle, the angular vein is in close contact with the nerve. The angular vein runs a short horizontal course and joins the LD pedicle. The angular vein defines the lower boundary of the axillary dissection.

6. After identifying the angular vein and long thoracic nerve (*Fig. 4*), we sweep a finger along the thoracodorsal nerve to the apex of the axilla, pushing it away from the area of dissection towards the chest wall. We then proceed with completing the axillary dissection by removing all the fibrofatty tissue in the interneural area (between the thoracodorsal nerve and LD pedicle), thus completing our level 1 axillary clearance.
7. To complete level 2 and 3 clearance, the pectoralis major is gently retracted superiorly. We then clear the inter-pectoral area, taking care not to injure the lateral pectoral nerve that runs in this space.
8. As we proceed further towards the apex, we stay close to the chest wall until we reach the reflection of the costoclavicular ligament (Halsted's ligament), which corresponds to the point where the axillary vein becomes the subclavian vein.

We consistently encounter a direct tributary to the axillary vein from the fibrofatty tissue in the apical level 3 region, which requires careful clipping to avoid torrential bleeding. All fibrofatty tissue in levels 2 and 3 is now dissected away to complete the dissection.

After completing the axillary dissection, we diligently check for any bleeding, especially from the chest wall.

Results

We have followed the lateral exposure of the LD pedicle technique in 140 breast cancer patients with significant nodal burden and high BMI from January 2020 to January 2024. This approach has resulted in a less than 1% injury rate to the LD pedicle and

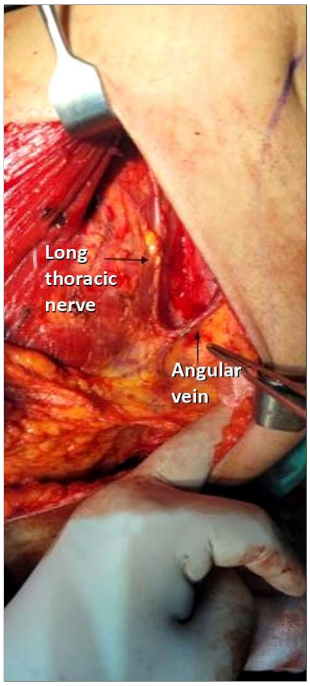

Figure 4. Relation of long thoracic nerve and angular vein

the long thoracic nerve. It ensures a safe and effective dissection, reducing the risk of complications associated with traditional methods. The lateral exposure method provides better visualization and access to the LD pedicle, especially in challenging cases with high BMI or significant nodal burden.

Conclusions

This refined technique demonstrates that with careful dissection and adherence to anatomical landmarks, it is possible to achieve effective axillary clearance while minimizing the risk of nerve and vascular injury. Our experience suggests that this method should be considered a valuable option in both mastectomy and breast conservation surgeries for patients with significant axillary involvement.

Conflict of Interest

Authors declare no conflict of interest or funding sources. Authors declare no competing or financial interest.

Ethical Statement

Since this article describes a surgical technique, Institutional Review Board approval was not taken.

References

1. Giaquinto AN, Sung H, Miller KD, Kramer JL, Newman LA, Minihan A, et al. Breast Cancer Statistics, 2022. CA Cancer J Clin. 2022;72(6):524-541.
2. Soerjomataram I, Bray F. Planning for tomorrow: global cancer incidence and the role of prevention 2020-2070. Nat Rev Clin Oncol. 2021;18(10): 663-672.
3. Mehrotra R, Yadav K. Breast cancer in India: Present scenario and the challenges ahead. World J Clin Oncol. 2022;13(3):209-218.
4. Mamounas EP. NSABP breast cancer clinical trials: recent results and future directions. Clin Med Res. 2003;1(4):309-326.
5. Fisher B, Anderson S, Bryant J, Margolese RG, Deutsch M, Fisher ER, et al. Twenty-year follow-up of a randomized trial comparing total mastectomy, lumpectomy, and lumpectomy plus irradiation for the treatment of invasive breast cancer. N Engl J Med. 2002;347(16):1233-1241.
6. Veronesi U, Cascinelli N, Mariani L, Greco M, Saccozzi R, Luini A, et al. Twenty-year follow-up of a randomized study comparing breast conserving surgery with radical mastectomy for early breast cancer. N Engl J Med. 2002;347(16):1227-1232.
7. Giuliano AE, Ballman KV, McCall L, Beitsch PD, Brennan MB, Kelemen PR, et al. Effect of Axillary Dissection vs No Axillary Dissection on 10-Year Overall Survival Among Women With Invasive Breast Cancer and Sentinel Node Metastasis: The ACOSOG Z0011(Alliance) Randomized Clinical Trial. JAMA. 2017;318(10):918-926.
8. Boughey JC, Suman VJ, Mittendorf EA, Ahrendt GM, Wilke LG, Taback B, et al. Sentinel lymph node surgery after neoadjuvant chemotherapy in patients with node-positive breast cancer: the ACOSOG Z1071 (Alliance) clinical trial. JAMA. 2013;310(14): 1455-1461.
9. Dhanushkodi M, Sridevi V, Shanta V, Rama R, Swaminathan R, Selvaluxmy G, et al. Locally Advanced Breast Cancer (LABC): Real-World Outcome of Patients From Cancer Institute, Chennai. JCO Glob Oncol. 2021;7:767-781.