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A Minimally Invasive Strategy for Breast Reconstruction: Latissimus Dorsi Muscle Flap Harvest by Single-Port Endoscopy

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Abstract

Background: Reconstructive surgery with endoscopic harvesting of latissimus dorsi muscle flap was initially described in 1994. Since then, few reports have shown benefits because of several difficulties with common endoscopic technique. For this reason, endoscopic harvest of latissimus dorsi muscle has not achieved popularity among plastic surgeons.

Method: We present the first case report in literature of latissimus dorsi muscle flap harvest by a single-port endoscopic, through a unique lateral thoracic incision. A minimally invasive surgery was designed in order to interpose tissue between atrophic skin and the chest wall of a 42 years old woman with history of fibromyalgia and who had always presented difficult postoperative pain control.

Results

Surgery took 110 minutes and no additional incision was needed. Postoperative course was uneventful and pain was well controlled by means of common drugs. Subcutaneous emphysema was resolved in 48 hours. Donor site drains were removed 48 hours after surgery with no further seroma formation.

Conclusion

This case shows us that a single-port endoscopy could be considered as another tool for breast reconstruction in selected patients.

Keywords: Minimally invasive surgery; Breast reconstruction; Single-port endoscopy; Latissimus dorsi muscle; Mastectomy

Introduction

Endoscopic harvest of latissimus dorsi muscle flap in reconstructive surgery was initially described in 1994 [1]. Since then, few reported series have shown its use for oncological breast reconstruction and has not achieved popularity among plastic surgeons because of difficulties maintaining optical cavity, thorax curvature and prolonging surgical time [2]. This technique has been attempted by multiple groups and is still practiced in certain centers [3-5], even robotic harvest series have been reported. Due to several drawbacks such as poor line of sight around the curvature of the back, limitations of endoscopic instrumentation, difficulties maintaining an optical window and economic costs, most groups have abandoned this technique [6].

According to the current trend toward less aggressiveness in breast reconstruction, a minimally invasive harvest of the latissimus dorsi flap has long been a desirable goal. To the best of our knowledge, herein we present the first case report in literature using a single laparoscopic port device for latissimus dorsi muscle flap harvesting, without adding scars at the back, through a unique lateral thoracic incision [7-9].

Materials and Methods

We present a 42 years old woman who had breast cancer 4 years ago and had undergone a mastectomy and immediate reconstruction with expander-prosthesis. During the last year she presented a local recurrence, so further surgery with removal of the prosthesis, axillar lymphadenectomy, chemotherapy and radiotherapy was performed. The patient had a history of fibromyalgia and always presented difficult postoperative pain control. She refused breast reconstruction but complained about discomfort related to her atrophic skin adhered to deep planes. Therefore, a minimally invasive surgery was designed in order to interpose tissue between the atrophic skin and the chest wall (Figure 1).

With patient in prone position, a 3 cm incision was made overlying the lateral extent of the previous mastectomy scar,

avoiding placement of any new scar. Finger blunt dissection was made to place a single-incision laparoscopic surgery device (SILS™, Covidien) under latissimus dorsi muscle level (Figure 2).

It was connected to a standard laparoscopy tower and was blown with CO_2 at 25 mmHg. A 5 mm 30-degree optic and hinged clamp were used. After dissecting out all submuscular space, the trocar was repositioned in a subcutaneous level to dissect the subcutaneous plane. When the desired flap size was achieved, the muscle was sectioned with an electrothermal bipolar vessel sealer 5 mm (Ligasure™, Covidien). Once the flap was detached from its medial and caudal insertions, it was mobilized proximally paying attention to the pedicle location (Figure 3). Finally, the flap was transferred and positioned without any difficulty at the anterior chest wall through the same incision.

Results

Whole surgery took 110 minutes and no additional incision was needed. Postoperative course was uneventful and pain was well controlled by means of common drugs. Subcutaneous emphysema was resolved in 48 hours. Donor site drains were removed 48 hours after surgery with no further seroma formation. In a 10-month follow-up, no hassles related to the anterior chest wall or the donor site (Figure 4).

Discussion

For long time surgeons had been inspired by the potential advantages of endoscopic technique. However, in plastic surgery it has not gained widespread use due to lack of distensible cavity to work at. Even more in latissimus dorsi flap harvesting, chest wall curvature jeopardizes visibility and makes even harder to establish this technique as the preferred approach. Laparoscopic techniques described before needed to employ multiples trocars [1,5], are too expensive, [8-11] or they use devices of their own design that are not routinely available [6]. Against SILS (Single Incision Laparoscopic Surgery)

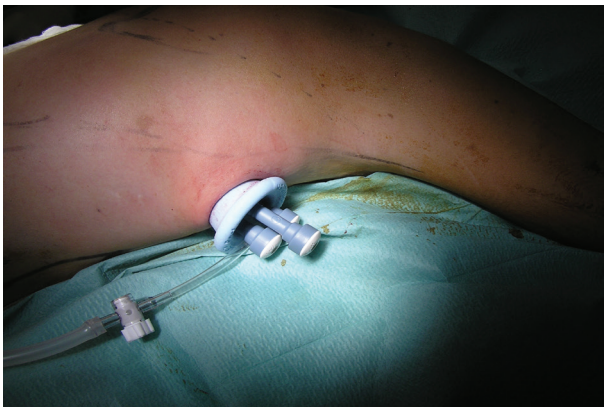

Figure 2: Right side of the patient positioned prone on chest rolls. Note that positioning of the arms can be some-what forward and the fore arms are below the table mattress surface. Single-port devise was place in a 3 cm incision over the previous lateral mastectomy scar. In this position, endoscopic instruments can move quite comfortable.

Figure 3: Same position of figure 2, showing the muscle fully harvest from the back. Then the flap was transferred and positioned without any difficulty at the anterior chest wall through the same incision.

Figure 1: This 42-year-old woman had a breast cancer recurrence 3 years after mastectomy. Expansion of surgical margins, chemo and radiotherapy was needed. After treatment she remained with atrophic skin firmly attached to the chest wall that caused her pain and discomfort to move the arm.

Figure 4: Same patient one month post-operatively. Flap donor site is well healed, with no scars at the back.

must be said that requires working in line with the camera making movements difficult to perform because of instrument crowding [7,8]. Nevertheless, technological innovations such as single port, 5 mm high definition optic, flexible or angled scope and improved hemostatic instruments, should make us reconsider procedures that seemed abandoned.

Commonly, pressure used in abdominal laparoscopy is between 8-12 mmHg. This way, it is possible to distend the peritoneal cavity without major problem to perform intra-abdominal surgeries. However, to harvest the latissimus dorsi muscle flap by endoscopy, a space that does not exist under normal conditions in the subcutaneous layer must be accomplished. We achieved and easy flap harvest using high pressure up to 25 mmHg. Although there was a certain degree of subcutaneous emphysema, it was minimal and after 24 hours was completely resolved. In no case, this did imply a greater difficulty during mechanical ventilation, and was not a significant complication for the patient during post-operative period.

Using classic bipolar and monopolar cauterization, the percentage of revision due to bleeding was reported as high as 4% in certain series [2]. However, this issue has been overcome by the use of electrothermal bipolar vessel sealer, [12] which allows a neat hemostasis and decreases the amount of seroma formation, although some reports underline that there is no difference in seroma incidence between classic and endoscopic techniques. With this new technique, the authors do not intend to demonstrate that this is a better technique than traditional open-air surgery to harvest the latissimus dorsi muscle flap [10]. But we strongly believe that endoscopic harvest of the latissimus dorsi muscle flap introduces a new scope into the current trend trying to minimize flap donor site morbidity, even more if we are using a single port approach. Although further studies are needed, it may shorten hospital stay by reducing postoperative pain, with early drain removal. The most important thing is that at the same time improves aesthetic results and reduces donor site morbidity by avoiding a noticeable scar at the back. In counterpart, flap harvesting may take longer compared to classic techniques and endoscopic surgical skills are needed. For this purpose training is the key to master surgical technique and decrease surgical time.

Conclusions

Latissimus dorsi muscle flap harvesting assisted by single port endoscopy should be considered in our armamentarium for breast reconstruction. Nevertheless most important factors will be patient selection criteria and recognizing SILS limitations.

Disclosures Statement

The authors declare that there is no conflict of interest regarding the publication of this paper.

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