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Case Report

The Vertical Rectus Abdominis Myocutaneous Flap for Complex Abdominal Wall Reconstruction on a Relapse Case of Monophasic Synovial Sarcoma

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ABSTRACT

Introduction: Vertical Rectus Abdominis Myocutaneous (VRAM) flap is a chosen method for a large wound closure instead of Anterolateral Thigh (ALT) flap. Both versatile and highly vascularized flaps share almost similar advantages for large wound closure. In our case, the site and size of the wound are the points of consideration.

Case Presentation: A 16-year-old girl with a chief complaint of a large progressive lower abdominal mass enlarged since January 2021 that has grown back from the same site. Abdominal CT-Scan shows a tumor in the right lower abdomen infiltrated to the pelvic cavity and spanning from the lower abdominal area all the way to the groin area. Histopathology interpretation suggests a Monophasic Synovial Sarcoma. The patient underwent a second tumor resection with VRAM flap as the wound closure. The benefits of this versatile flap are excellent dead space obliteration and low Surgical Site Occurrence (SSO's).

Conclusion: As postulated in many studies VRAM flap is an excellent flap for a CAWR procedure. The expected SSO's is non-existence during the postoperative follow-up.

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INTRODUCTION

Synovial Sarcoma is a relatively rare and malignant soft tissue tumor that arises from periarticular soft tissue or any other soft tissue throughout the body, the extremities are the most common site, and less likely to appear on the other part of the body. The incidence rate is 2,5%-10% of all soft tissue sarcoma [1–5], and the incidence in childrens population is only 0,81/1.000.000 [2]. Compared to all Soft Tissue Tumor in childhood, Synovial Sarcoma represents 30% of the case [2].

The treatment for Synovial Sarcoma is individualized for each patient. Post-tumor resection surgery often needed a defect closure procedure in accordance with the size and site of the defect. Complex abdominal wall reconstruction (CAWR) is always a challenge for the plastic and reconstructive surgeon, the goal is to improve the patient's quality of life after the surgery. To achieve such a goal the surgeons, have to obtain a strong, durable and dynamic abdominal wall by mesh-reinforced innervated musculofascial reapproximation and also strive to minimize post-surgery complications such as hernia recurrence and surgical site occurrences [6].

A considerable wound with the peritoneum as its base, this kind of wound is considered as a complete defect that needs immediate abdominal wall reconstruction [7, 8]. It has been reported by numbers of studies about Vertical Rectus Abdominis Myocutaneous flap (VRAM) and Anterolateral Thigh (ALT) flap as the flaps of choice for complex abdominal wall

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reconstruction in the area of lower abdomen and groin [9–18]. Generally, VRAM flap is the first choice for a large defect closure, because of its large coverage, large vascularization, an sufficient flap rotation but the frequent occurrence of hernia as the complication that is more likely to happen. ALT flap is another flap of choice with various flap design flexibility, a faster wound healing on the recipient site, lower postoperative complications and lower morbidity [19]. The disadvantages of ALT flap are the downstream location and vascularization arise also from the distal location away from the defect [21]. Here we present a case with resected case of large lower abdominal tumor that require a complex abdominal wall reconstruction.

CASE PRESENTATION

A 16-year-old girl came to the outpatient clinic with a chief complaint of a large lower abdominal tumor that grew back after surgery. According to the patient, the big lump on her right lower abdomen enlarged progressively since January 2021. At first it was just as big as a marble and it grew rapidly to the size of a fist. The patient underwent an operation and chemotherapy several months before the patient came to our hospital. She experienced no walking difficulties, no fever, no weight loss, and no pain during the time of tumor growth in the past 1 year. The patient showed up in the outpatient clinic with a large lump on her lower right abdomen and the upper part of groin. The mass is bigger than it was before the surgery.

Abdominal Ultrasonography examination shows heterogeneous masses of lower abdomen with no sign of liver metastasis and no intra abdominal organ abnormalities. The Radiologist suggested an Abdominal CT Scan contrast examination and the results are suspected malignant lymphadenopathy, ascites in pelvic cavity and multiple paraseptal emphysema of both lungs. Macroscopically, this patient has a large single mass, with > 20 cm in diameter and painless hard nodules.

The patient underwent a second tumor resection surgery in the exact same site. After the resection we found out it was a couple of yellow masses with the diameter more than 17 cm respectively, the tumors are resected from almost the entire groin area, along the right iliac region went up to the distal third of the right lumbar area with peritoneum at the base of the wound. The big masses are sent to the Anatomical Pathology Laboratory to have further examination. From biopsy we got a pathognomonic result to the Monophasic Synovial Sarcoma, such as the oval-spindle-like-cell, hemangiopericytoma-like thin vascular sheath and hyperchromatic appearance [1,2,4].

We planned the flap design beforehand; a local groin flap is considered sufficient for wound coverage. However, after the tumor resection, the estimated area of tumor resection is larger than expected. We decided to conduct Vertical Rectus Abdominis Myocutaneous (VRAM) Flap procedure as wound closure. The flap is harvested from the donor site and rotates inferiorly to the recipient site, the depth of the flap successfully obliterates the dead space and sufficiently leveled the surface [6,20]. As written in the Ten Commandment of Plastic Surgery, the Anterolateral Thigh (ALT) Flap came out first and then VRAM Flap is the next in line, as we take the site and the size of the wound as our consideration, VRAM flap considered more ideal for this type of wound [7]. To prevent hernia as the SSO's that might occur in the future [21], we reinforced both donor and recipient site with mesh [11,20]. Two studies show the flaps of choice for a complete lower ⅓ abdominal defects is Inferiorly Rectus Abdominis Flap. This type III pedicled flap can provide a considerable defect coverage [8].



Fig. 1. The Gross Appearance of the Relapse Tumor

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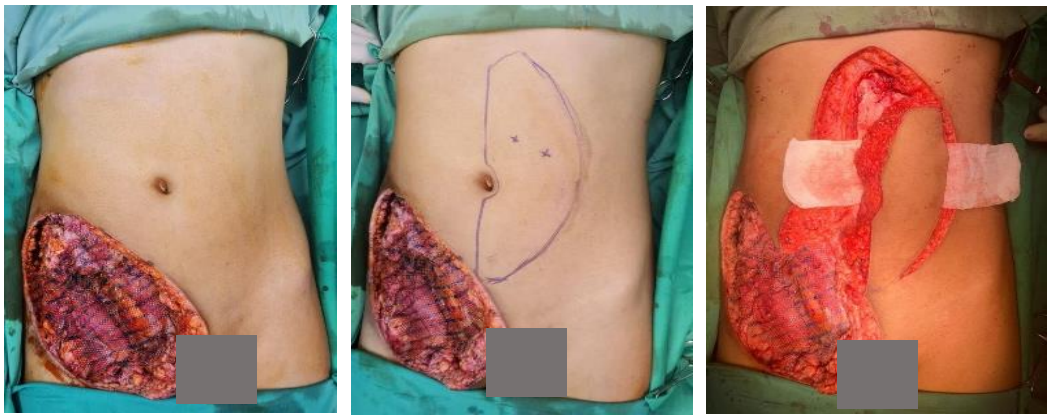


Fig. 2. (A) Post Tumor Resection with Peritoneum as the Base of the Wound. (B) Flap Design (C) Large Incision and Harvesting

Outcomes And Follow-Up :

Post-operative follow-up is conducted daily during the inpatient care in the surgery ward, the patient is discharged after 4 days, continued with routine outpatient clinic weekly visits, twice a month and a monthly visit to observe the flap without consumption of any medication other than antibiotics and analgetics 1 week post surgery. No SSO's such as Hematoma,

Seroma, Dehiscence, Skin necrosis, Hernia and Other medical complications, the patient only experiencing minor complaints of light pain with visual analog scale (VAS) about 2-3, seemingly limited movements, minor sleep difficulty and itch on the stitches [6]. After 7 weeks follow-up, the SSO's is non-existence, the patient has a painless post-operative wound. Patient The VRAM flap is successful.



Fig. 3. Post-Operative Day (POD)-0, Large Incision was Made as the Result of the Wound Closure for the Complete Abdominal Wall Reconstruction

DISCUSSION

The nature of Synovial Sarcoma itself is malignant, as long as the mass is operable it demands a cancer-cell-free margin, it also sometimes means obtaining a large resection in order to achieve it [1,2]. That is what happened in our case, a large tumor resection that took almost an entire groin, along with a considerable area of right lower iliac and a distal third of right lumbar area, we do not expect that it would take such a considerable area post tumor resection surgery. We already planned a local groin flap and obviously the wound coverage is not sufficient, so we came up with another plan: the VRAM flap or the ALT flap.

Both VRAM and ALT flap are basically share almost similar advantages in versatility, range of flap rotation, wound coverage and dead space obliteration. VRAM flap provides a promising post operative results with a considerable wound coverage, flap versatility (from abdominal defects to peritoneal defects), a wide range of flap rotation, Type III pedicled flap with a rich vascularization and VRAM flap is reported as the "*bulkiest*" flap to obliterate the dead space [11,12]. Meanwhile the distal necrosis, seroma, hematoma, hernia and wound dehiscence are most likely to occur [16]. One study postulated about the adjuvant technique the improve the post operative outcome [17].

Meanwhile the ALT flap provides almost the same features that VRAM flap has to offer, but with faster wound healing meanwhile some study shows that ALT flap complication that could altered the post operative outcome is a chance for thrombosis because of an excessive femoral vessel manipulation during harvesting and flap transfer [15].

In this case, we choose VRAM flap over the ALT flap considering the size of the defect and a considerable area of goin, prevent femoralis vein thrombosis with the prominent bulk that VRAM flap has, the thickness of flap will sufficiently obliterate dead space. Post operative results are beyond our expectation, there are no SSO's and a faster wound healing, and a subsequent leveling of flap bulk to the surrounding surface. One study postulated the average VRAM flap healing time is 60 days, meanwhile in our case it only took 14 days. On the other hand, the average ALT flap healing time is 42

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days. in the same study stated that the time to heal is the time of operation day until all the stitches were removed from the recipient site [15].

CONCLUSION

Choosing the VRAM flap as a "lifeboat" turned out successfully rewarding, VRAM flap as a large wound closure for a Complex Abdominal Wall Reconstruction on Monophasic Synovial Sarcoma is highly recommended with a faster wound healing and no SSO's during the 7 weeks follow up. With its flap versatility, a wide range of flap rotation, an excellent coverage and a remarkable dead space obliteration, this flap can always be the first choice or the second and we can always use another flap design according to the need of each case.

In this case report the implications of "Thy shalt provide thyself a lifeboat" and "Thy shalt not have routine" is clear and obvious. As a plastic surgeon we are bound to obey and follow the commandement that our predecessor had created as a mean of guidance to observe.

Informed Consent Statement:
This study has obtained written consent from the patient's parents represented by the patient's father to be published for the development of knowledge and learning.

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CONFLICT OF INTEREST

The authors state that they have no conflicts of interest.

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