방사선 치료로 인한 회음부 결손의 재건을 위한 유리 광배근 근피판술

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Radiation Induced Perineo-Coccygeal Defect Coverage with Latissimus Dorsi Musculocutaneous Free Flap

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Perineal defect reconstruction is usually encountered in oncological conditions, trauma, or infection such as Fournier's gangrene. Reconstructive surgeons face challenges due to the complex structure and diversity of the different tissue and crucial organ components. In addition to innate characteristics, fecal contamination, difficulty of patient position to minimize trauma to the region, and suboptimal conditions for wound healing such as radiotherapy are other burdens to overcome. Common wound complications after perineal reconstruction are caused by remnant dead space, contamination, inadequate soft tissue volume, and chemoradiation-related entities after oncological resection. Classic methods such as direct closure or closure with local, regional, and distant pedicled flaps may often be unsuccessful. Free flap coverage has been reported to be successful, as the transferred tissue is outside the radiation field. We present a rare case of radiation-induced perineo-coccygeal defect covered with a free latissimus dorsi myocutaneous flap after abdominoperineal resection.

Key Words: Surgical flaps, Wound healing

Extensive perineo-coccygeal defects can result from oncological resection of gynecological, urological, and colorectal tumors. The advancement of techniques in ablative surgeries has led to more-radical resections that leave larger defects¹. At the same time, consideration for careful preservation of crucial structures that contribute

various functions such as urination, defecation, sexuality, and reproduction cannot be neglected². Defects that are irradiated for oncological management are especially more challenging because of the unfavorable conditions for wound healing and resistance to infection³. Placing a well vascularized muscle portion to fill a dead space

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can be helpful to prevent local infection⁴. Local flaps are often unavailable or complicated, which leaves surgeons with distant or free flaps as options¹.

CASE REPORT

A 68-year-old male patient who was taking medications for diabetes and hypertension consulted the plastic and reconstructive surgery department because of a complicated perineal wound. It was a dehiscence surgical site of a previously performed abdomino pelvic resection (APR), with the wound surface measuring 8×4 cm in size and a depth of 5 cm. Six months before, the patient was diagnosed as having stage IIA rectal cancer (carcinoembryonic antigen-positive adenocarcinoma with moderate

vasculopathy). APR was performed 2 weeks before, after the patient underwent neoadjuvant concurrent chemoradiotherapy (CCRT) with Xeloda at a high dose of 50.4 Gy/28 Fx for 6 weeks.

The wound presented with purulent discharge and foul odor. The white blood cell (WBC) count was 22,000, and the C-reactive protein level was 17.3, which suggested a wound infection. *Enterococcus faecalis* and *Enterococcus gallinarum* were confirmed in the microbiology culture studies. Intravenous Ampicillin/Sulbactam was administered in accordance with the susceptibility studies and consultation with the department of infectious disease internal medicine. After initial debridement of the obviously infected and non-viable tissue, the WBC count and C-reactive protein level decreased to 11,000 and 1.7, respectively. Reconstructive measures were planned.

Under general anesthesia, the patient was placed in a

Fig. 1. Preoperative photograph of the perineo-coccygeal defect. Skin defect measured 8×4 cm. The dead space was 5 cm deep, covered with infectious slough and unhealthy granulation.

Fig. 3. Intraoperative photograph of the recipient vessel. Left superior gluteal artery and veins were identified and confirmed to be patent.

Fig. 2. Intraoperative photograph after debridement of non-viable tissue. The final skin defect was 13×5 cm. The dead space was approximately 6 cm deep.

prone position but slightly tilted toward the right side. The left portion of the upper extremity, the trunk, and both buttocks were draped and prepared. The preoperative photograph shown in Fig. 1 depicts the infectious slough covering the wound bed and deep dead space. Hydrosurgical debridement was performed using Versajet (Smith & Nephew, St. Petersburg, FL, USA), which was helpful to reach areas with restricted visualization. The intraoperative photograph presented in Fig. 2 shows the defect that had to be reconstructed. The final skin defect was 13×5 cm in size.

With a transverse incision across the left buttock, the superior gluteal artery and vein could be identified (Fig.

Fig. 4. Intraoperative photograph of the donor site. Left latissimus dorsi musculocutaneous free flap was harvest in a prone position. The donor site was primarily closed.

Fig. 5. Intraoperative photograph of the harvest latissimus dorsi flap. The skin paddle measured 13×5 cm with muscle portion of 24×10 cm.

3). The pulsation and appearance of the vessels were evaluated, and we decided to use them as recipients for anastomosis. The left latissimus dorsi (LD) myocutaneous muscle was harvested in the same position (Fig. 4). The harvest flap included a skin paddle of 13×5 cm in size and muscle portion of 24×10 cm in size (Fig. 5). Thoracodorsal artery and vein were anastomosed end to end to the superior gluteal artery and vein. The muscle-portion of the flap was used for dead space obliteration, and the skin paddle was sutured to the defect without tension. The 6-month postoperative photographs in Fig. 6 show satisfactory results.

DISCUSSION

Reconstruction of the perineo-coccygeal region involves a complex anatomy, various internal organs, and a unique microbial environment. Defects are congenital or caused by trauma, infection, tumors, lymphedema, or other uncommon factors such as sex dysphoria. Regardless of the cause, restoration of the unique anatomy and function that can endure external pressure/friction is important. Even minor wound complications of reconstruction in the perineo-coccygeal region, unlike in other regions, can lead to poor hygiene and embarrassment, which can negatively impact self-esteem and quality of life².

Fig. 6. Six month postoperative photograph. The wound was completely healed without complications or subjective complaints.

With the advancement of the multidisciplinary concepts of cancer of the perineal region that are aimed at a curative result, radical resection often leaves extensive defects⁵. Preoperative neoadjuvant CCRT has become the standard therapy for rectal cancer to downstage tumors⁶, followed by aggressive resection that may involve the pelvic viscera, blood vessels, muscles, or pelvic bone. Furthermore, maintaining quality of life over mere survival is the goal of modern oncological approaches. A successful reconstruction should recreate the three-dimensional anatomy, prevent functional loss, and sustain potential chemoradiotherapy¹.

Previous radiotherapy and infection can complicate matters, like in the present case. Multiple factors such as an irradiated field (with neoadjuvant CCRT), remnant infection (due to the unique microbial environment, fecal contamination, and/or unfavorable vasculature of the irradiated tissue), deep dead space, and future chemoradiotherapies had to be considered. We presumed that local flaps would be suboptimal adjacent tissue. Furthermore, prolonged delay of reconstruction that can be beneficial for infected wounds can actually be detrimental, as it results in scar formation in the deep structures of the pelvic floor².

Various forms of gluteal flaps such as rotation or advancement flaps can be used for relatively large defects. Perforator flaps based on the superior or inferior gluteal artery can also be used without significant donor-site morbidity. Pedicled muscle flaps can be useful for filling dead space while the well-vascularized muscle helps resist infection¹. Successful reconstruction using the above-mentioned flaps has been frequently reported. Nevertheless, some could argue that transferring tissue outside the radiation field is a better choice for patients who have received radiotherapy.

APR can be complicated with impaired wound healing, at an incidence of up to 26%. Distant metastasis, preoperative radiotherapy, tumor T-stage, smoking status, perioperative blood transfusion, preoperative chemotherapy, and side effects of preoperative chemoradiotherapies are risk factors of poor wound healing in APR. Hence, free flaps can be advantageous in these unfavorable settings⁷.

The LD free flap is well known for its easy dissection, reliability, large skin paddle, abundant muscle portion, long pedicle, large pedicle caliber, and versatility. Hence, it is advocated for the reconstruction of various defects such as those in the extremities and those created after head and neck cancers. The thin and pliable muscle portion can be used rather freely according to the defect, which can vary after debridement⁸. It can also be harvested with the patient in the prone position, which allows a two-team approach in cases of perineo-coccygeal defect reconstruction. This can be especially advantageous for patients who have undergone APR and CCRT, as their general conditions are likely to be suboptimal. Considering the remote location of the thoracodorsal artery and LD muscle from the radiation field, it may also be beneficial.

We believe the LD musculocutaneous flap can be a considerable option for patients with radiation-induced perineo-coccygeal defects after APR.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

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회음부 결손의 재건은 악성종양, 외상, 또는 포니에르 괴저와 같은 감염 등으로 발생한다. 이 부위의 재건수술은 복잡한 해부학적 구조, 중요한 기능을 하는 다양한 장기와 복합적인 조직 때문에 많은 외과의사들이 난관에 봉착하게 된다. 또한, 대소변으로 인한 창상오염에 노출되기 쉽다는 점, 수술 부위가 눌리지 않게 환자 자세를 유지하기가 어렵다는 점, 방사선 치료를 받아 창상회복이 더딘 경우가 종종 있다는 점 등이 어려움을 가중시킨다. 이러한 요소들 때문에 결손부 재건을 위한 고전적인 방법인 일차봉합, 국소피판술, 유경 피판술로 만족스러운 결과를 얻지 못하는 경우도 종종 발생한다. 유리 피판술을 이용하면 방사선 치료 범위에서 먼 조직을 사용할 수 있게 된다. 이처럼 방사선 치료와 복회음절제술 이후 발생한 회음부의 결손부에 대해 광배근 유리피판술을 이용한 재건술로 만족스러운 결과를 얻은 증례에 대해 보고하고자 한다.

색인단어: 피판술, 창상 치유

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