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Extended split superior gluteus maximus musclocutaneous flap and reconstruction after resection of perianal and lower gluteal hidradenitis suppurativa

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Summary Various modifications of the gluteus maximus musculocutaneous flap have been reported. Among them, the split gluteus maximus musculocutaneous flap is easy to prepare and does not leave ambulatory insuffiency. However, the safety of extending the skin portion beyond the margin of the muscle has not yet been clarified.

Angiography was performed systemically on 11 fresh cadavers, and the distance the margin of the gluteus maximus muscle could be extended was observed. Based on these anatomical data, reconstruction after total skin resection of perianal and lower gluteal hidradenitis suppurativa was performed with an extended split superior gluteal maximus musclocutaneous flap. Surgery was performed on three sides of two patients.

From the anatomical results, we found that it is possible to extend the flap beyond the iliac crest several centimetres superiorly, and to the gluteal fold inferiorly, and several centimetres laterally. We designed the flap such that the extended area is situated in these areas. All flaps took well and did not show any congestion or necrosis. There were no recurrences at least 1 year after surgery.

When reconstructing the lower part of the buttock, an extended split superior gluteus maximus musclocutaneous flap is easy to raise and leaves aesthetically satisfactory results. Thus it may be the first choice for reconstruction of the lower buttock.

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A gluteus maximus (GM) musculocutaneous (MC) flap is frequently used in the reconstruction of the sacral or gluteal portion. If the patient can walk, not all but a part

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of the GM muscle is recommended to be used in order to leave no ambulatory dysfunction. Thus, there are many modifications to GM-MC flaps designed to leave the muscle function intact. Among them, split GM-MC flaps are easy to raise and do not leave ambulatory insuffiency. The methods of splitting the muscle vary: splitting superior and inferior halves,[1,2] superficial and deep halves,[3,4] or using just a part of the muscle.[5] For the present report, we used a split superior half of the GM muscle based on the superior gluteal artery.

As the muscle is split, the skin portion that exists just on the muscle becomes smaller. So, if the skin defect is large, it is sometimes necessary to extend the skin portion beyond the muscle margin. But safety and blood supply with the skin portion incorporated into the flap beyond the margin of the muscle have not been clarified as yet.

Hidradenitis suppurativa is a chronic inflammatory disease. Patients who suffer from it are distressed by complications such as abscesses, sinus tract formations, fistulisation and scarring.[6] If the affected area is left untreated, squamous cell carcinoma can grow from the hidradenitis suppurativa.[7–9] Thus, resection of all the inflamed skin is recommended when treating hidradenitis suppurativa.[10–13] After resection, skin grafting is frequently performed.[14–16] The contour and the function as a cushion after skin grafting are, however, not satisfactory. Also, as the lesion frequently occupies the perianus, the grafted skin tends to become infected by bacteria followed by graft necrosis. From these points of view, local flaps may be chosen after resection of the affected area.[17–20]

In the present study, we present the arterial anatomy around the GM muscle, showing the efficacy of the extension using systemic injected fresh cadavers. Based on these data, we show the safe area that can be extended in the extended split superior (ESS) GM-MC flap, and report on two patients successfully treated for perianal and lower buttock hidradenitis suppurativa on three sides.

Materials and methods

Angiography was performed systemically on 11 fresh cadavers. The method of systemic injection is reported elsewhere.[21] The skin around the buttock was dissected including the upper half of the GM muscle and surrounding tissue from superficial to deep fascial layer to determine the efficacy of the extended flap based on the superior gluteal artery. Based on an anatomical study, we applied the ESSGM-MC flap to cover the skin defect after resection of hidradenitis suppurativa in two patients, on three sides. Both patients are male and have been suffering from hidradenitis suppurativa for more than 10 years. All of the lesions exist at the lower buttock, and the sizes of skin defects ranged from 143 to 224 cm^2.

Results

From the anatomical study in the GM muscle, a huge arterial network was found along the direction of the muscle fibres. Also, skin perforators existed extensively in the whole area of the muscle. The direction of the blood vessels was inclined laterally after they penetrate the fascia of the muscle. After penetrating the GM muscle, the perforators were strongly connected to the next territory of the lateral femoral circumflex artery that penetrated the tensor fascia lata muscle. The skin territory of the perforators of the superior gluteal artery extended beyond the iliac crest and was strongly connected to the next territory of the 12th dorsal branch of the thoracic artery. As this territory covers about 10 cm above the iliac crest, the skin extent is estimated to be safe for at least several centimetres beyond the iliac crest. As for the caudal side, the perforators of the superior gluteal artery had a rich network with the perforators of the lower half of the GM muscle. The territories of these perforators of the lower half of the GM muscle did not extend much beyond the gluteal fold (Figure 1). From these observations, extension of the skin portion in the ESSGM-MC flap was estimated to be possible several centimetres beyond the iliac crest superiorly, the anterior margin of the tensor fascia lata muscle laterally, and the gluteal fold inferiorly.

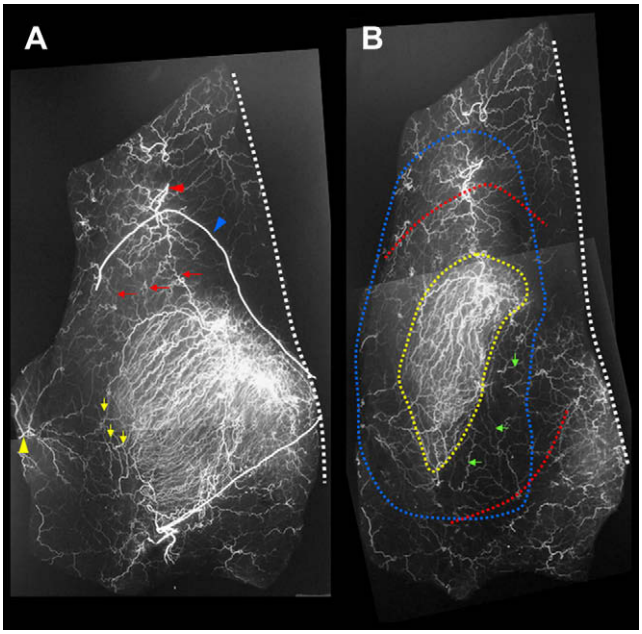

Figure 1 Arterial anatomy around the left buttock. (A) GM muscle is dissected with surrounding skin superficial to the deep fascia. The perforators after penetrating the GM muscle strongly connect (A, yellow arrows) to the next territory of the lateral femoral circumflex artery (A, yellow arrow head). GM perforators of the superior gluteal artery also extend beyond the iliac crest (A, blue arrow head) and are strongly connected (red arrows) to the next territory of the 12th dorsal branch of the thoracic artery (A, red arrow head). (B) The inferior half of the GM muscle is removed from A. The perforators of the superior gluteal artery have a rich network (B, green arrows) at the caudal side on the lower half of the GM muscle, but the territory does not go beyond the gluteal fold. The blue dotted line indicates the estimated safety line of skin survival with an ESSGM-MC flap. The yellow dotted line indicates the margin of the superior GM muscle. The red dotted lines indicate the iliac crest and the gluteal fold. White dotted lines indicate the centre lines.