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The inferior mesenteric vessels as recipients when performing free tissue transfer for pelvic defects following abdomino-perineal resection. A novel technique and review of intra-peritoneal recipient vessel options for microvascular transfer☆

Nicola C. Petrie [a,c,*], James K.K. Chan [c], Helen Chave [b], Caroline N. McGuiness [a]

[a] *Department of Plastic Surgery, Salisbury District Hospital, Salisbury, UK*
[b] *Department of Colorectal Surgery, Salisbury District Hospital, Salisbury, UK*
[c] *Department of Plastic Surgery, Stoke Mandeville Hospital, Aylesbury, UK*

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Summary Successful microvascular transfer of tissue is dependent upon suitable vessels not only of the donor tissue but also at the recipient site. Congenital deformities, previous surgery, infection or irradiation at the recipient site may render vessels less suitable for this purpose. Under such circumstances it becomes desirable to identify suitable recipient vessels remote to the compromised area. In cases where external beam radiotherapy has been delivered, the superficial surface area damaged can be rather extensive precluding the use of even the longest of flap pedicles — a problem potentially addressed by searching for recipient vessels deep to the tissue planes affected. We report one such case where the inferior mesenteric vessels were used as recipient vessels for the microvascular transfer of a free Latissimus Dorsi musculocutaneous flap to reconstruct an extensive perineal defect following abdomino-perineal resection where the vessels would otherwise serve no purpose. Whilst a limited number of intra-peritoneal vessels have previously been reported as recipient vessels for free flap surgery there has not been, to our knowledge, any report of utilising the inferior

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* Corresponding author.
E-mail address: nicolapetrie@yahoo.co.uk (N.C. Petrie).

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mesenteric artery (Inf Mes A). Whilst based on a single case report, this article examines the literature describing microvascular transfer of tissue to compromised recipient sites and it reviews previously reported recipient vessel options available when reconstructing the perineum, abdominal wall or trunk with particular emphasis on intra-peritoneal options.

Successful microvascular transfer of tissue is dependent upon suitable vessels not only of the donor tissue but also at the recipient site. Congenital deformities, previous surgery, infection or irradiation at the recipient site may render vessels less suitable for this purpose. Under such circumstances it becomes desirable to identify suitable recipient vessels remote to the compromised area. In cases where external beam radiotherapy has been delivered, the superficial surface area damaged can be rather extensive precluding the use of even the longest of flap pedicles — a problem potentially addressed by searching for recipient vessels deep to the tissue planes affected. Utilising vessels within a body cavity as recipients for free tissue transfer is unconventional and may be considered by some as unnecessarily invasive. This is a justifiable concern unless the nature of the proposed surgery demands access to the cavity, in which case, as long as the chosen vessel is expendable, such a procedure confers no additional morbidity. This principle resonates entirely with the situation encountered when reconstructing perineal defects at the time of AP resection for some rectal cancers and recurrent or recalcitrant anal carcinomas.

The 1970s and 1980s saw a paradigm shift in the management of anal canal neoplasms in terms of delivering chemoradiotherapy (CRT) as the first line treatment in place of surgery.[1–4] Furthermore, recent evidence supports the use of pre-operative adjuvant RT in the treatment of colorectal carcinomas. Although surgery is currently the mainstay of management for colorectal carcinomas, it is also reserved for the salvage (either curative or palliative) of locally recurrent or persistent anal carcinomas. We therefore encounter a situation where the vast majority of such patients require surgery in areas compromised by radiotherapy damage. This provides the rationale for the growing body of evidence supporting the use of well vascularised distant flaps when reconstructing abdomino-perineal resection (APR) defects in cases of low rectal and recalcitrant or recurrent anal neoplasms. Such reconstructions often involve the use of a pedicled vertical rectus abdominis muscle (VRAM) flap.[5] However, there are situations when the deep inferior epigastric (DIE) vessels are not suitable, when previous surgery precludes the use a VRAM flap or when microvascular transfer is preferable.

We report one such case where the inferior mesenteric vessels were used as recipient vessels for the microvascular transfer of a free Latissimus Dorsi musculocutaneous flap to reconstruct an extensive perineal defect. Whilst a limited number of intra-peritoneal vessels have previously been reported as recipient vessels for free flap surgery there has not been, to our knowledge, any report of utilising the inferior mesenteric artery (Inf Mes A). Whilst based on a single case report, this article examines the literature describing microvascular transfer of tissue to compromised recipient sites and it reviews previously reported recipient vessel options available when reconstructing the perineum, abdominal wall or trunk with particular emphasis on intra-peritoneal options. Finally, we highlight the original concept, ease and suitability of utilising the inferior mesenteric vessels as recipient vessels and in particular, their suitability as such when reconstructing perineal defects following AP resection.

Case report

Mr. H was a 65-year-old man who presented with biopsy-proven recurrent squamous cell carcinoma (SCC) of the anal canal and faecal incontinence that was profoundly affecting his lifestyle. He had received extensive pelvic irradiation and chemotherapy for three previous recurrences since his initial diagnosis in 1993. His co-morbidities included hypertension and depression. He had undergone peripheral bypass surgery for occlusion of his common iliac vessels, thought to have been as a result of radiotherapy, which consisted of a PTFE graft from the bifurcation of his right common iliac artery to the right popliteal artery and a further PTFE graft from the original graft to the left popliteal artery. After appropriate radiological investigation and MDT discussion it was felt that APR and colostomy formation with immediate reconstruction would achieve, at best, a cure for his disease or else palliation of faecal incontinence.

As a result of the extensive radiotherapy damage and bypass surgery, both local reconstructive options and the more commonly utilised recipient vessels were unlikely to be suitable (Figure 1 and Table 1). A duplex scan was therefore performed to investigate the patency of the regional vessels to determine their suitability either as pedicles for VRAM reconstruction or as recipient vessels for microvascular transfer. This demonstrated occlusion of both external iliac and common femoral arteries. The right DIEA was small, consisting of a narrow patent lumen, which was stenosed by approximately 40% in sections and could not be followed above the level of the umbilicus, and the right superior epigastric vessel could not be identified. The left DIEA was of good calibre, measuring 1.4 mm in diameter from groin level to its continuation with the superior epigastric. The presence of the SGAP and IGAP vessels was also confirmed.

In light of these findings, a plan was made to reconstruct the defect with a free LD flap using the left DIE vessels as recipients. The patient subsequently underwent AP resection and raising of a free myocutaneous LD flap. Unfortunately, during formation of a left sided colostomy the left DIEA was transected. Whilst considering options for