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Original article

Abdominoperineal resection in anal cancer: Reconstruction of the perineum with a myocutaneous flap from the anterior rectus abdominis muscle

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A B S T R A C T

Introduction: Abdominoperineal resection after radiotherapy has a high rate of perineal wound complications. The aim of this retrospective study was to evaluate the results of perineal reconstruction with a rectus abdominis muscle myocutaneous flap in patients with recurrent or persistent anal cancer.
Patients and method: Between 2006 and 2010, six male HIV+ patients were treated after initial treatment failure with chemotherapy. An anterior rectal myocutaneous flap was performed after abdominal-perineal excision.
Results: The mean age was 36.3 years (range: 30-42). Primary healing of the perineal wound was achieved in the first thirty days. There were no major complications in the immediate post-surgical period or after a mean follow up of 26.5 months. There were 2 (33.3%) minor complications associated with the perineal wound. There were no complications of the abdominal wall.
Conclusion: The use of an anterior rectus abdominis myocutaneous flap in patients with recurrent or persistent anal cancer is associated with a low rate of perineal complications.

Resección abdominoperineal en cáncer anal: reconstrucción del periné con colgajo miocutáneo de músculo recto anterior abdominal

Palabras clave:
Cáncer anal
Resección abdominoperineal
Colgajo miocutáneo del recto anterior abdominal
Radioterapia

R E S U M E N

Introducción: La resección abdominoperineal tras radioterapia se acompaña de una alta tasa de complicaciones de la herida perineal. El propósito de este estudio retrospectivo fue evaluar los resultados de la reconstrucción perineal con un colgajo miocutáneo de músculo recto abdominal en pacientes con cáncer anal recurrente o persistente.
Pacientes y método: Entre 2006 y 2010, 6 pacientes varones VIH+ fueron tratados después del fracaso del tratamiento inicial con quimio-radioterapia. Tras amputación abdominoperineal, se realizó un colgajo miocutáneo de recto anterior.

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Resultados: La media de edad fue de 36,3 años (rango: 30-42). La curación primaria de la herida perineal se consiguió en los primeros treinta días. No hubo complicaciones mayores en el postoperatorio inmediato o tras un seguimiento medio de 26,5 meses. Hubo 2 complicaciones menores (33,3%) relacionadas con la herida perineal. No hubo complicaciones de la pared abdominal.

Conclusión: La utilización de un colgajo miocutáneo del recto anterior del abdomen, en pacientes con cáncer anal recurrente o persistente, se asoció con un bajo índice de complicaciones perineales.

Introduction

Chemoradiotherapy is the treatment of choice for patients with squamous cell carcinoma of the anal canal, as it achieves 5-year survival for between 60%-92% of cases.[1,2] The disease is persistent or recurrent in 10%-29% of cases.[1,3,4] Abdominoperineal resection (APR) is an important part of the therapeutic arsenal,[5] having obtained 5-year survival for between 30%-75% of patients.[3,6,7-10]

Previous radiotherapy and wide perineal excision are frequently used to obtain disease-free margins, however an increase in perineal wound complications is associated with these techniques. Therefore, different procedures must be used to improve perineal wound closure and perineal defect healing.[11,12]

The main surgical alternatives for perineum reconstruction are myocutaneous flaps from the anterior rectus abdominis muscle (RAM),[13] gracilis muscle[14] and the gluteal muscle.[15]

The purpose of this retrospective study is to present our initial experience using RAM flaps on patients with persistent or recurrent squamous cell carcinoma of the anal canal.

Material and method

Patients

Six patients underwent surgery between March 2006 and July 2010 for persistent or recurrent anal cancer. All patients were male and HIV+, with an average age of 36.3 years (range: 30-42). They all had received curative radiotherapy of 64Gy dose over 32 consecutive fractions and 5 patients received adjuvant chemotherapy. Initial staging was T3No (n=2), T3N1 (n=1), T2No (n=2), T2N1 (n=1). Two patients showed histological persistence of the disease (persistent cancer) at three and five months after adjuvant treatment, and 4 patients, who had a complete response to initial treatment, showed recurrence 6 months after adjuvant treatment.

Surgical technique

The surgical procedure had been previously reported.[16] Before the operation we marked the flap following an elliptical line from the xiphoid region until 2 cm from the infraumbilical mid-line, so as to obtain a flap of skin between 5-7 cm wide at its widest point (Figure 1). The flap from the navel area consisted of skin, subcutaneous tissue, anterior rectus fascia and rectus muscle. The fascia was not as wide as the skin but there was enough of it to allow perforating vessels to be included. The rectus muscle was cut at its superior insertion. At the infraumbilical area, the muscle was cut away from its anterior rectus fascia, leaving the subcutaneous tissue and skin intact. The inferior epigastric vessels and the muscle's insertion at the pubis were carefully preserved (Figure 2). The musculocutaneous flap was turned towards the pelvis and the perineal defect created following the APR (Figures 3A, 3B, and 3C). It was fixed to the pelvic wall to prevent internal hernias from developing. The edges of the perineal wound were stitched using absorbable sutures. (Figure 4). We employed layer closure to close the abdominal wall, and did not use mesh following the colostomy. In the infraumbilical region tension-free closure was performed, and the remaining anterior rectus fascia and the posterior fascia could approximated to the linea alba. We left a drainage tube in the subcutaneous space and another in the pelvis (Figure 5).

Results

No abdominal wound complications were recorded. There were 2 minor perineal wound complications: 1 lateral opening (<3 cm) and 1 seroma, neither of which required re-operation. Complete perineal wound healing was achieved before 30 days for all patients. Average postoperative stay was 20 days (range: 18-29 days). Complete tumour resection (R0) was performed on 5 patients (83.3%) and 1 underwent a microscopically incomplete resection (R1). After an average follow-up of 26.5 months (range: 2-41 months) all patients remained alive, without showing complications.

Discussion

Most studies that refer to employing RAM for perineal reconstruction following APR include a wide range of illnesses, but there are very few which report on anal cancer. Nissar and Scott[17] have identified and reviewed 36 studies, providing 91 cases, since the technique was reported in 1984[13] until April 2008. Since then, the number of anal cancer patients treated with this technique has significantly increased.[10,18–22]

Figure 1 – Flap marking.

APR used for persistent or recurrent anal cancer following chemoradiotherapy has been associated with a high percentage of perineal wound complications, between 67%-80%.[8,9,23] They are mainly due to infection, opening and superior wound healing delay at 3 months, reaching values of 47%, 59%, and 66%, respectively in some studies.[9,23] These percentages are much higher than those reported following APR for rectal cancer.[24,25] In a retrospective study, Christian et al reported a greater number of major perineal wound complications for anal cancer patients than rectal cancer patients (50% compare to 10%). Similarly, when patients had been administered radiotherapy before APR, perineal complications were significantly more frequent in patients with anal cancer (62% compared to 11%). The need to perform a wide perineal resection to obtain disease-free resection margins, high doses of radiation, different fields of application and longer surgery waiting times, can probably contribute to a greater number of perineal wound complications after primary closure.[8,11]

Figure 2 – Moving the flap.

Alternative procedures are therefore necessary for primary closure of the perineal wound following APR.[12]

Pelvic and perineal omentoplasty has been used following APR, with or without previous radiotherapy, for various anal and rectal disorders. Excellent results have been reported,[26] with primary wound healing in 80% of cases, and 100% at 3 months.[27] Morbidity is associated with perineal wound complications and is significantly greater for APR than for a RAM flap, having reached 100%[9] in some studies. Radice et al[28] compared myocutaneous flaps (13 patients) with primary perineal wound closure and omentoplasty (24 patients). They reported that the perineal closure with flaps significantly reduces the delay in wound healing (25% compared to 7.7%), the number of perineal complications (37% compared to 15%) and reinterventions (25% compared to 0%). Lefevre et al[20] analysed the results of 43 RAM patients and 46 omentoplasty patients, following APR for persistent or recurrent anal cancer. They found that perineal complications (26.8% compared to 48.9%), wound healing time (18.7 compared to 117 days), and the number of perineal hernias (0% compared to 15%) were significantly lower for perineal reconstruction with a RAM flap.

Some authors have described 60% of perineal complications following APR and perineum reconstruction with gracilis muscle for patients with recurrent anal cancer.[9] However, this procedure significantly reduces the percentage of major perineal complications (from 46% to 12%) compared with primary closure of the perineal wound in patients undergoing APR for rectal cancer.[29] This technique's main advantage is that it does not interfere with stoma creation and is particularly practical for relatively close perineal defects.[30] However, it has many disadvantages: a high incidence of poor vascularisation and a limited rotation arc. Furthermore, its volume is not appropriate for large perineal defects, meaning that a bilateral flap would have to be used.[30]

There are few data concerning the use of the gluteal muscle for perineal reconstruction following APR for cancer. A study on 7 anal cancer patients showed that 71% had perineal complications.[31] Holm et al[32] applied this technique on 28 rectal cancer patients with neoadjuvant treatment and obtained primary perineal wound healing for 85% of cases. A bilateral flap is needed for large perineal defects, especially those in which part of the sacrum has been removed. Di Mauro et al[33] used a V-Y bilateral flap on 12 patients (4 anal, 6 rectal and 2 vulvar cancer) and reported 66.6% of openings, 33.3% being in the donor-site. These authors believe that APR with partial sacrectomy would be the main indication for bilateral gluteal flap. However, other authors believe that the gluteal muscle is not able to profoundly fill the pelvis and should only be indicated for patients with a chronic sinus disease after primary closure of the perineal wound.[34]

Routine use of RAM flaps is essential when approaching an extensive perineal resection with wide margins for anal canal excision.[10] The procedure is quick and the patient's position does not need to be changed. The vascular pedicle is excellent, and allows extensive arc rotation, which makes access to the pelvic cavity and the perineal defect much easier. It is extensive, voluminous and enough to fill the pelvic space without interfering with performing concomitant stomas. Among the potential disadvantages is that tension is

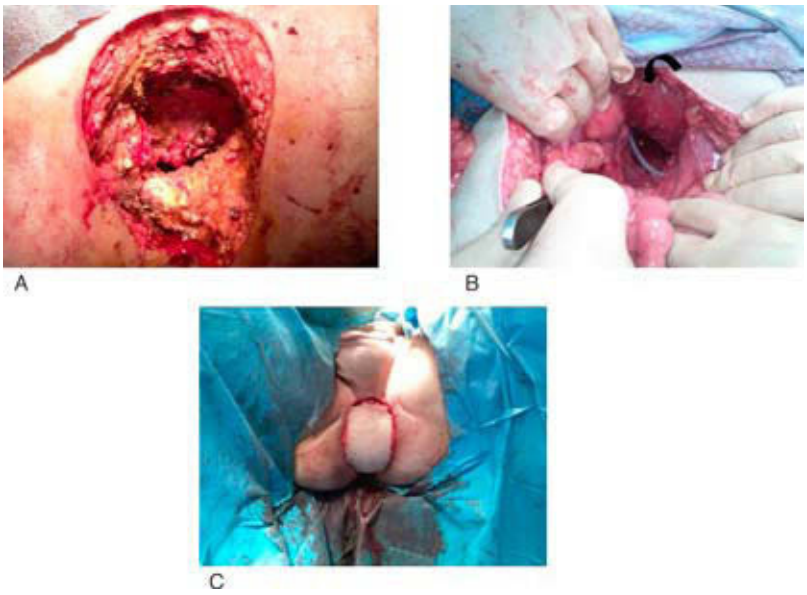

Figure 3 – A) Perineal defect following APR, B) and C) Rotating flap towards the pelvis (arrow) and perineum.

caused to the abdominal wall, provoking parietal opening and herniation.[35]

We did not find any major perineal wound complications, but 33.3% of the patients had minor complications. None of the patients needed re-operation and healing was complete in less than 30 days. Although this percentage is not better than other studies, the severity of these complications is comparatively more favourable.[18,21,36,38]

Some authors recommend using mesh, particularly in the supraumbilical region,[3,36] but this view is considered very controversial. For our patients, the abdominal wall was closed without a mesh and a drainage tube was inserted in the prefascial space. We did not observe any postoperative openings or eventrations after an average follow-up of 26.5 months. Extensive studies showed that using a RAM flap did not increase morbidity or abdominal wall complications despite having created a defect using the skin, fascia and muscle to reconstruct the perineum.[19,20,37,38]

Figure 4 – Flap sutured to the perineum.

Figure 5 – Closure of the abdominal wall.

Complete or partial flap survival was noted for all of our patients. Total ischaemia (between 0%-8%[10,36-38]) usually occurs during the first few days following surgery, but it has also been reported in one study to take place at 51 days.[36] This complication may lead to thrombosis or vascular pedicle torsion. We did not cut the rectus muscle free from its inferior insertion, as the pedicle must remain intact so that the flap can survive. Much care must be taken during dissection to preserve the epigastric vessels and the origin of the muscle in its insertion in the pubis, so that a vascular strain or torsion does not occur.[38]

Internal hernia in an intestinal loop is a rare, immediate or delayed postoperative complication with serious consequences. Following recommendations given by Buchel

et al,[38] we attached the muscle edge to the pelvis so as to minimise this complication.

Studies with a similar average follow-up time showed that the incidence of perineal herniation ranged between 0%-0.9%.[19,20,38] More extensive studies, with average follow-up of more than 3 years, reported that this percentage rose to 6%, a percentage that is very similar to that observed following primary closure of the perineal wound.[37] It is possible that hernias occur more frequently as the follow-up period is longer.

We studied very few patients but it represents a clinical group within a rarely treated entity. We believe that the RAM flap is a safe procedure, which is easy to perform and which has an acceptable morbidity rate. It should be considered as the technique of first choice for perineal reconstruction following APR for persistent or recurrent anal cancer patients.

Conclusion

We recommend using a RAM flap for perineal reconstruction following APR for persistent or recurrent anal cancer patients, given that it is easy to perform, has excellent viability and a low rate of complications.

Conflict of interest

The authors affirm that they have no conflict of interest.

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