

# Audit of Perineal Wound Healing after Primary Closure of the Perineal Wound without Perineal Drainage in Abdominal Perineal Resection for Malignancy

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**Abstract** This audit has retrospectively assessed the result of primary closure of the perineum irrespective of risk factors for healing: pre-operative radiotherapy, faecal contamination, age, advanced malignancy and diabetes mellitus. 74 consecutive patients (49 males and 25 females median age 70 years) with rectal carcinoma (72) and anal carcinoma (2) who had undergone abdominal perineal excision from August 1989 to December 1999 were identified retrospectively. Complications of the perineal wound were tabulated. Fifty five of 74 patients (75%) healed primarily by two weeks and delayed healing occurred in 19 (25%) patients including 3 (4%) with complete dehiscence. Four of nine patients (45%) who received pre-operative radiotherapy achieved primary healing. Two of 32 patients (6%) who received post-operative radiotherapy after the perineal wound had healed developed wound complications. The primary healing rate of the advanced tumours Dukes' stage B & C (74%) was similar to the overall healing rate. The average length of hospital stay following primary healing was 12.25 days and 17.05 days following delayed healing. Other factors comparing tumour stage, sex, age and weight were not statistically significant. A technique of complete primary closure ("sealing") of the perineal wound by obliterating the perineal dead space over a transabdominal suction drain can provide a primary healing rate of 75% by two weeks irrespective of risk factors. Primary closure is safe and can be advised in most cases.

**Keywords** Anorectal cancer, Abdominal perineal resection, Primary closure ("sealing" of the perineum), Trans-Abdominal suction drain, Primary wound healing, Risk factors

## 1. Introduction

There is overwhelming evidence to support the superiority of perineal wound closure with suction drainage compared with leaving wounds open following abdominal perineal excision for malignancy provided there is no pre-existing sepsis and there has been no faecal contamination during rectal excision [1-10]. Morbidity is substantially reduced by leaving the wound open to granulate in patients with known risk which are associated with wound breakdown. These factors include previous radiotherapy, age advanced malignancy, diabetes mellitus and inadequate haemostasis [1-3]. In this retrospective series, all wounds were closed initially except in one patient with pre-existing perineal sepsis and two patients with uncontrollable haemorrhage in whom delayed primary closure was done. By complete obliteration of the perineal dead space over a trans-abdominal suction drain which reaches into the

perineum and opposing the skin edges subcuticularly we propose that a clean, dry and "sealed" perineum without an exiting perineal drain reduces infection and it is probably more comfortable for the patient. This study reported the result of primary closure of the perineum irrespective of risk factors following abdominal perineal excision for malignancy within a ten year period at the Cumberland Infirmary, Carlisle, UK.

## 2. Patients and Methods

In the ten year period between August 1989 and December 1999, 74 consecutive patients underwent abdomino-perineal resection for malignancy (72 for rectal carcinoma and two for anal carcinoma) at the Cumberland Infirmary, Carlisle. Some of the patients with operable tumours had received a short course of pre-operative adjuvant radiotherapy (5Gy for 5 days) while those with fixed rectal tumours had received a long course of radiotherapy. Those with involved resection margins had post-operative radiotherapy after the perineal wound had healed. The patients were given no bowel preparations before the operation. Prophylactic antibiotics in the form of a second generation cephalosporin and

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metronidazole were commenced pre-operatively and continued for three days. Prophylaxis against deep vein thrombosis was carried out in the form of subcutaneous heparin 5000 iu bd, TED stockings and the application of a pneumatic calf compression device in theatre. A standard operative technique was carried out. With the patient in the Lloyd-Davies position, the tumour operability was assessed by the abdominal operator who then commenced rectal mobilization from above. The perineal excision was elliptical, extending posteriorly to the tip of the coccyx. In the female patient the incision incorporated the posterior vaginal wall anteriorly, in the male patient it terminated anteriorly at the level of the perineal body. Mobilization of the rectum was completed from below with the rectum being delivered through the perineal wound. Meticulous perineal haemostasis was ensured. Measures were taken to avoid faecal contamination, including suturing of the anal orifice and staple transection of the rectum.

The pelvic peritoneum was closed from above only when possible with a continuous absorbable suture over a suction drain (redivac) inserted trans-abdominally to reach the perineum. Below, the remnant perineal muscles, ischiorectal fat and subcutaneous tissue were approximated with interrupted vicryl and the perianal skin was carefully approximated using continuous subcuticular vicryl suture. The wound was sprayed with opsite and dressed. There was no variation in the surgical method as it was carried out or supervised by the same surgeon. The perineal wound was inspected daily by the medical staff for signs of cellulitis, collection, (haematoma, seroma, abscess) and dehiscence. If there was evidence of a persistent cavity or haematoma which was not draining adequately in the presence of a partially healed skin wound, the primary closure was converted into an open wound by removal of all superficial and deep sutures to allow healing by secondary intention. The suction was removed when it ceased to drain significant amounts of blood or serum which was usually from the fifth post-operative day. In the event of incomplete healing at the time of discharge, the progress of the wound was assessed at the follow-up clinic.

### 3. Method

In a retrospective examination of individual patients' case notes, the following data was recorded: age, sex, stage of tumour, pre or post-operative radio/chemotherapy, pre-operative risk factors (faecal contamination, locally advanced tumour, haematoma), co-morbidity, (body weight, diabetes mellitus, COAD and cardiac risk factors) post-operative complications were recorded as general or specific to the perineal wound.

Complications of the perineal wound were tabulated as, infection which included cellulitis or discharge of purulent material, collection (haematoma, seroma and abscess) and dehiscence which is recorded as minor when no deeper than skin level and involving less than 10% of the entire length of

the wound and major when between 10% and 100% of the length of the perineal wound dehiscence, with the dehiscence being confined to the skin and immediate sub-dermal tissue. Complete dehiscence was recorded when the entire wound broke down.

Primary healing was recorded when the entire length of the perineal wound was healed within two weeks. The wound was considered to be healed once dressings were no longer required. The occurrence of wound dehiscence as early (< 2 weeks) or later (>2weeks) were noted. The length of hospital stay, the state of the wound at first follow-up and late complications- delayed wound healing, perineal sinus and perineal hernia were recorded.

## 4. Results

Of the 74 patients, 49 were male and 25 were female with an age range of 50-85 years (median 70 years)

### 1. Healing of the Perineal Wound (table 1)

Primary healing of the perineal wound within two weeks occurred in 55 (75%) patients ( $P < 0.05$ ).

Delayed healing occurred in 19 patients (25%). This consisted of 2 serous collections, 2 perineal haematomas, 1 pelvic haematoma, 1 perineal abscess, 10 perineal dehiscence and 3 perineal sinuses.

### 2. Effect of Adjuvant Radiotherapy (table 1/2)

The primary healing rate for the 9 patients who had received pre-operative radiotherapy was 45% while 5 patients (55%) demonstrated delayed healing.

The delayed healing group consisted of 2 late minor dehiscence, 1 early major dehiscence, 1 early serous collection and 1 late perineal abscess. Of the 32 patients who received post-operative radiotherapy after the perineal wound had healed only 2 (6%) developed wound complications. These were a late minor perineal wound dehiscence and a chronic perineal sinus.

### 3. Effect of tumour stage (table 1)

Tumours were staged using Dukes' classification. 43 of 58 patients (74%) with advanced Dukes' B & C disease achieved primary healing which is about the same as the overall primary healing rate.

35% of the primary healed group had Dukes' B disease as compared to 55% of the delayed healing group. This was however not statistically significant. ( $P > 0.05$ ).

### 4. Effect of sex (table 1)

Primary healing of the perineal wound occurred in 34 of 49 male patients (69%) and in 21 of 25 female patients (85%), although females seem to have more advanced tumours (71%) as compared to males (54%) in the primarily healed group. These differences were not however statistically significant ( $P > 0.05$ ).

### 5. Effect of age and Weight

When primary perineal wound healing occurred, the mean age of the patients was 66.6 years whereas the mean age for

the delayed healing group was 71.2 years. The mean weight of the patient in the primary healed group was 69.1kg and 71,1kg for the delayed healing group. These differences were statistically insignificant ( $P>0.05$ ).

## 6. Length of hospital stay

When primary healing of the perineal wound occurred, mean period of post-operative hospitalization was 12.25 days, in the remaining patients the comparable mean value was 17.05 days. This was statistically significant ( $P<0.05$ ).

**Table 1**

### Results

■ **55(75%) primary healing** (within two weeks) (95%CI = 63% to 83%)

■ **19 (25%) Delayed healing**

■ **Effect of radiotherapy**

Pre-op 4/9 (45%) primary healing

Post-op 30/32 (94%) primary healing

■ **Effect of tumour (Dukes') staging**

Primary healing: Dukes' A 11/14 (78%)

Dukes' B 19/29 (65%)

Dukes' C 24/29 (82%)

(A vs B+C: 95%CI = -23%); (B vs A: 95%CI = -36% to 17%); (B vs C : 95%CI = -38% to 5%) i.e.  $p>0.05$

■ **Effect of sex**

Primary healing

Males 34/49 (69%) Females 21/25 (84%) (95%CI = -32% to 7%)

Dukes' A 8/48 (27%) Dukes' A 3/24 (13%)

Dukes' B 13/48 (27%) Dukes' B 6/24 (25%)

Dukes' C 13/48 (27%) Dukes' C 11/24 (46%) (95%CI = -40% to 4%)

Anal cancer 1

( $p>0.05$ )

■ **Average length of hospital stay**

Primary healing : 12.25 days

Delayed healing : 17.05 days

(95%CI = -8 to -2 days);  $p<0.05$ )

**Table 2**

### Effect of pre-operative radiotherapy

Total number of patients 9

Primary healing 4 (45%)

Short course : Dukes' A

Long course : Dukes' A (fixed)

Long course : Dukes' C (local invasion to bladder)

Long course : Anal cancer

### Delayed healing 5 (55%)

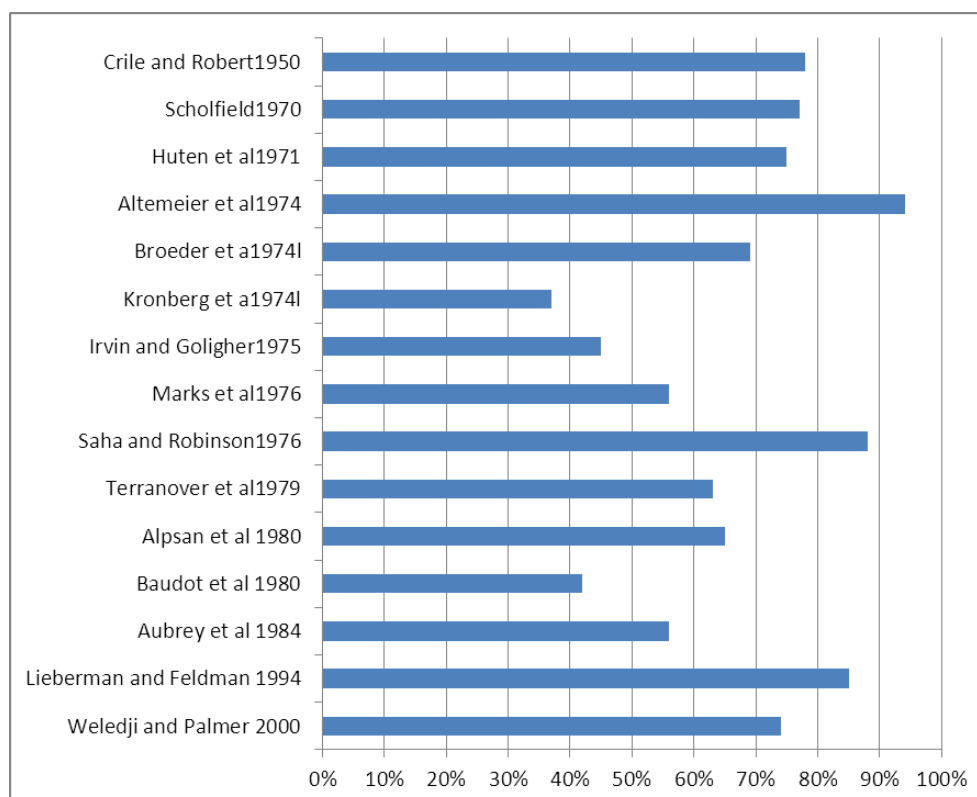
Late minor dehiscence 2: short course : Dukes' B

: Long course : Dukes' B (fixed)

Early major dehiscence : long course : Dukes' B (fixed)

Perineal abscess (late) : short course : Dukes' C

Serous collection (early) : long course : anal cancer (salvage)



**Figure 1.** Incidence of primary perineal wound healing after abdominoperineal excision of the rectum for cancer with primary closure over suction drains

## 5. Discussion

Historically, perineal wounds have been managed without primary closure and healing allowed to occur by secondary intention. This will eventually yield good results but it is inconvenient to the patient and time consuming.

Many authors have suggested that primary closure is safe in the absence of risk factors for healing and have applied individual modifications that they feel would yield better results (figure 1) [4-17]. The incidence of primary healing of the perineal wound following abdominal perineal excision for malignancy ranges from 37% to 92% reflecting the widely different patient selection [4, 17]. For example Altemier *et al* 92% healing rate was confined to carefully selected patients who did not have extensive tumour, pre-operative radiotherapy or intra-operative rectal damage, whereas Baudot *et al* 41% healing rate was for all patients [7, 15].

In this retrospective series of 74 patients, 75% achieved primary healing of the perineal wound within two weeks in the presence of risk factors which included locally advanced tumour, pre-operative radiotherapy, faecal contamination, haematoma and diabetes mellitus. The primary healing rate is still within the upper range achieved by authors who avoided the risk factors (figure 1).

The reasons for delayed wound healing in this series (25%) seem to emanate mostly from the presence of a collection *i.e.* haematoma, serous or infected collection which may also precipitate wound dehiscence. There was only one case of cellulitis but with no serious local wound sepsis that caused delayed healing. This may be due to the effects of perioperative antibiotics and the absence of an exiting perineal drain.

Pre-operative radiotherapy had only a partial effect on the healing rate although the sample size was small and the effect of the length of the course could not be ascertained. Pre-operative radiotherapy was not frequently advocated for operable rectal carcinoma in this study as its beneficial role in conjunction with total mesorectal excision is far from clear and is still the subject of a clinical trial (MRC07) [24].

There is no consensus on the relationship between Dukes' classification and perineal healing [16, 25]. The primary healing rate of the advanced tumours (B&C) was similar to the overall healing rate suggesting that other factors would be contributing to the delayed healing rate *i.e.* haematoma, faecal contamination and pre-operative radiotherapy. In this series gross contamination of the perineal wound with faeces or pus occurred in three cases and only one contaminated from a perforated rectum achieved primary healing. The other with pre-existing perineal sepsis from a recto-vaginal fistula complicating rectal tumour underwent delayed primary closure and postoperative radiotherapy. She developed a chronic perineal sinus. Primary closure in the third case with operative contamination from a lateral rectal wall laceration resulted in a major dehiscence. This compares at a similar rate with Broader *et al*'s series in which

out of 15 contaminated wounds only 5 of these healed primarily [8]. Saha reported that all wounds healed by first intention when there was no contamination but that 26% broke down in contaminated wounds [25].

Baudot *et al* recommended an attempt at primary closure regardless of contamination on the grounds that nothing was lost should the wound subsequently need to be opened and packed [15]. Indeed, there may be contamination not grossly visible during operation as in slight loss of faeces from the anal orifice or from the excised stump especially in our series of patients who received no bowel preparation.

Faecal contamination is however, probably the most important indication for leaving the perineal wound open.

Efficient closed suction drainage is crucial to the success of primary perineal wound closure as it eliminates dead space and ensures the immediate evacuation of blood [1, 2, 14, 18-21]. It allows the complete closure of the perineal wound and minimizes the risk of exogenous bacterial contamination. Saha and Robinson reported a primary wound healing rate of 34% with perineally - sited drains as compared with 85% for drainage through the abdomen [12].

Tompkins and Warshaw reported the highest primary wound healing rate (96%) without discharge which they attributed to closing all defects in the pelvic floor over closed suction trans-abdominal drains after rectal excision for inflammatory bowel disease [19]. The same closure method has essentially been used in our series following rectal excision for malignancy.

Lieberman and Feldman achieved an 85% primary healing rate using a system of continuous closed trans-abdominal pelvic irrigation and suction drainage after primary wound closure [17] and Aubrey *et al* demonstrated a 56.4% primary healing rate with intermittent irrigation and suction drainage of the pelvic space using a perineal drain [16]. The design fault with this technique is that the air filters may become waterlogged and suction may not be maintained.

Irvin and Goligher had demonstrated no significant differences in primary healing rate between suture or non-suture of the pelvic peritoneum [10].

In the absence of major complications it is the healing of the perineal wound that is the main factor that determines the duration of post operative hospitalization. In our series of average length of hospital stay following primary healing was 12.25 days and following delayed healing was 17.05 days. Failure of primary did not seem to cause further complications *e.g.* persistent perineal sinuses and secondary healing of these wounds mostly by 6 weeks were not more delayed than the traditional 'open' method which normally takes 12-14 weeks.

Delayed primary closure may be considered as an option in some cases but our experience is limited to the three cases in the series. This option is however, rarely feasible if not done early as the edges of the pelvic floor are so stiff and non compliant that is usually impossible to bring the edges together [1].

## 6. Conclusions

Our retrospective study of 74 patients who had undergone abdominal-perineal resection for malignancy have demonstrated a technique of complete primary closure of the perineal wound by obliterating the perineal dead space over a trans-abdominal suction drain and subcuticularly suturing the perineal skin can provide a primary healing rate of 75% by two weeks irrespective of risk factors.

This method of "sealing" the perineum without an exiting perineal drain is safe, efficacious and also provides the benefits of increased patient comfort, clean and dry wound healing and immediate ambulation. Primary closure of the perineal wound can be advised in most cases.

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