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Early removal of drains and discharge of breast cancer surgery patients: a controlled prospective clinical trial

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A prospective trial was conducted to see whether suction drains could safely be removed and patients discharged within 48 h of major breast surgery. Data from two consecutive groups of 50 patients each were compared. Statistical analysis confirmed demographic homogeneity between the two groups with regard to age, tumour size, lymph node involvement, grade of operating surgeon, procedures performed and the 48 h drainage volume. The first group of patients were discharged when drainage was considered acceptable (mean postoperative stay 4.5 days) (long stay). The second group had their drains removed and were discharged after 48 h (short stay).

No seromas developed in either group when the total drainage volume (TDV) was less than 150 ml. Seromas developed in 3 (6%) of the long stay group and 5 (10%) of the short stay group ($P > 0.05$, χ^2 test). No seromas in either group required more than two aspirations. We conclude that it is safe to discharge patients after removal of drains on the 2nd postoperative day.

With an ever increasing demand on fewer beds, it became apparent locally that the only way to preserve dedicated beds for patients with breast disease was to make use of a ward annex. This would entail admission on Tuesday, operation on Wednesday and discharge on Friday when the ward closed.

Before instituting this change in management, it was decided to compare 50 consecutive patients who were discharged in the normal way when their drainage had reduced to acceptable limits (long stay) with 50 consecutive patients in the new arrangements of drain removal and discharge 48 h after operation (short stay). It was explained to patients in the short stay group that beds would be made available elsewhere in the hospital after 48 h if necessary; the shorter stay was universally popular and no extensions were necessary during the study for medical or social reasons.

The main foreseeable complication would be an increase in seroma formation. Seromas have been reported in as many as 85% of patients undergoing axillary clearance *(1)* and 65% of patients having excisional biopsies have been shown to develop ultrasonically detectable seromas after suction drainage *(2)*. However, few have serious clinical implications. While suction drainage has been shown to decrease the incidence of seroma formation *(2–5)*, the number of drains used does not appear to be related *(6)*. However, the complication is more prevalent if drains have been removed before the drainage measures <30 ml in 24 h *(7)*. This is the major influence on the length of inpatient stay.

Patients and methods

The long stay group consisted of 50 consecutive patients undergoing surgery for breast cancer before August 1993.

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Of these patients, 23 underwent total mastectomy with axillary clearance (TM+AC), two total mastectomy (TM), 20 wide local excision with axillary clearance (WLE+AC) and five wide local excision (WLE). Of the 50 short stay patients, 28 underwent TM+AC, five TM, 16 WLE+AC and one WLE. Axillary clearance in both groups indicates dissection to level 3. Skin flaps were closed using 2/0 chromic catgut (Softgut®, Davis+Geck, Cyanamid of Great Britain) to the deep tissues and 3/0 Vicryl® (Ethicon® Ltd, UK) to skin.

Day case patients were excluded from both groups. All patients had closed suction drains (Redivac®, Biomet Ltd, UK). A non-bulky pressure dressing using gauze and Elastoplast® (Smith+Nephew, England) or Mefix® (Molnlycke, Sweden) was used in both groups. Parameters including age, tumour size, lymph node involvement and grade of operating surgeon were recorded for each patient.

Drainage volume was recorded 12 hourly for each patient. In both groups, shoulder exercises were started on the 1st postoperative day. The pressure dressings were taken down on the second day and the wound inspected. In the long stay group, the drains were removed when the daily drainage was < 30 ml. Patients were discharged only after their drains were removed. In the short stay group, the drains were removed irrespective of total volume drained. These patients were discharged on the 2nd day and a district nurse arranged for general and wound review on the 3rd day. All patients were reviewed on the 14th postoperative day in the outpatient clinic. Percutaneous aspiration was performed when there was clinical evidence of seroma formation and patients with local wound complications were reviewed weekly until the wound settled.

We analysed the difference in the 48 h drainage volume, total drainage volume (TDV), the duration of closed suction drainage, the duration of inpatient stay and local wound complications. We also analysed the relation of TDV and the drainage volume in the last 24 h to the incidence of seroma formation in the short stay group.

Statistical methods

In order to establish whether there was a significant difference between the demographic characteristics for the two populations, the difference between the means was tested using a two-sample *t* test. The actual method used depended upon whether the variances of the two groups of data were equal or not—tested using *F* distribution. The difference between proportions was tested using an approximation to the normal distribution. The last 24 h drainage volume data was tested against a χ^2 distribution in order to analyse the relation to seroma formation.

Results

Table I shows both group to be demographically similar. In neither group were there wound infection, wound breakdown or flap necrosis. There was no difference in the 48 h drainage volume between the long stay and the short stay group (mean 159.6 ml, range 10–1030 ml *vs* mean 148.1 ml, range 10–410 ml; $P > 0.1$, *t* test), further indicating homogeneity of the two groups. The mean TDV of the long stay group (246.5 ml, range 10–1730 ml) was greater than the short stay group (148.1 ml, range 10–410 ml) but this was not statistically significant ($P > 0.05$, *t* test). Three patients in the long stay group developed wound seromas; one required aspiration twice and two required a single aspiration (6%). Another patient in this group had a secondary haemorrhage requiring readmission and evacuation under general anaesthesia. Five patients in the short stay group developed wound seromas; two required aspiration twice and three required a single aspiration only (10%). This does not represent a significant difference in the frequency of seroma formation between the two groups ($P > 0.05$, χ^2 test). No patients in the short stay group required readmission for any complications, and in both groups all seromas resolved after a maximum of two aspirations. In the short stay group, no seromas were observed when the TDV was < 150 ml. A higher incidence of seroma formation was observed when the last 24 h drainage volume was > 50 ml (Table II).

In the long stay group, suction drains were kept in for a

Table I. Patient characteristics

	Long Stay	*Short Stay*	*P*
n	50	50	
Age (years)	mean 60.2 (range 27–97)	mean 59.3 (range 30–83)	NS
Grade of operating surgeon			
Consultant	22	27	NS
SHO/registrar	28	23	
Procedures			
WLE	5	1	NS
WLE+AC	20	16	
TM	2	5	
TM+AC	23	28	
Tumour size (cm)	mean 2.3 (range 1.0–6.0)	mean 2.7 (range 0.5–8.0)	NS
Lymph node metastasis	17	17	NS

t test, significant if $P < 0.05$; NS, not significant

Table II. Last 24 h suction drainage compared with subsequent seroma formation in the short stay group

	Drainage		
	< 50 ml	*> 50 ml*	*Total patients*
Seroma formation	2	3	5
No seroma formation	33	12	45
Total	35	15	50

$\chi^2 = 7.538$, $P < 0.001$
The probability of developing wound seroma is directly related to the volume of suction drainage in the last 24 h

mean duration of 3.9 days (range 1–12 days). Postoperative stay in this group of patients averaged 4.5 days (range 1–14 days). These figures show significant differences compared with the short stay group where the drains were removed and patients discharged at 48 h ($P < 0.0005$, t test).

Discussion

The postoperative management of patients after breast surgery remains controversial. The usual postoperative course is uncomplicated in these patients and the duration of inpatient stay is often dictated by the time the suction drains remain *in situ*. Drains are often kept in until the daily drainage falls below about 30 ml and this may take up to 12 days in our experience. They may in fact encourage drainage by stimulating tissue reactions or by suction. They may provide a port of entry for infective organisms. In an attempt to shorten inpatient stay without compromising seroma formation, patients have been discharged with drains *in situ* to be removed in outpatient clinics when the drainage volume falls below 30 ml. Two studies have found this to be a safe method that is accepted by most of the patients (*6,8*). However, patients had to be burdened with managing their drains during their convalescence. Increasingly, a more aggressive approach to suction drain management has been adopted where drains are removed regardless of daily drainage volume on the 2nd or 3rd postoperative day in combination with the use of myofasciocutaneous flap closure (*1,9*). The incidence of seroma formation in these patients has been shown to be acceptably reduced.

The incidence of seroma in the long stay group of only 6% is consistent with another study evaluating the use of suction drainage to reduce seroma formation (*4*). The finding of a positive correlation with the TDV and the drainage in the last 24 h with the frequency of seroma formation compares well with a previous study by Tadych and Donegan (*7*). However, this is not found to be clinically a problem as the overall incidence is low (10%) in the short stay group and all wounds healed completely after a maximum of two aspirations.

This study concludes that it is safe to remove suction drains at 48 h and discharge patients after major breast surgery for cancer without affecting wound healing.

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