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Stump healing in below knee amputations using soft versus rigid dressing

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Abstract

Introductions: Different techniques of postsurgical dressings are used after a below-knee amputation (BKA). This study compares the application of soft dressings versus rigid dressings on healing time and hospital stay after BKA.

Methods: In this cross sectional prospective analysis of outcome of two types of post-operative dressings after BKA during January 2012 to January 2018 at Shree Bhawani Hospital Birgunj, Nepal. Wound healing time and hospitalisation were compared between soft and rigid dressings.

Results: Out of 37 BKA, 20 received soft dressings with knee immobiliser and 17 rigid plaster dressings. Average age of patients in soft dressing group was 41 years (range 10-70) and in plaster dressing group 37.7 years (range 10-70). Two out of 20 (10%) with soft dressing and 13 out of 18 (76.47%) with the rigid dressing healed primarily, $p < 0.001$. Patients treated with soft dressings stayed in the hospital on an average of 35.2 days (range 22-49 days) and rigid dressings 18.4 days (range 12-31 days).

Conclusions: The patients with rigid dressings after BKA had significantly more primary wound healings and shorter length of hospitalisation compared to soft dressing.

Keywords: below knee amputation BKA, rigid dressing, soft dressing

Introductions

Post-operative stump dressing after below-knee amputation (BKA) uses gauze and wool soft stump dressing (SSD) held in place with crepe bandages. This delays the healing of the stump and prolongs the hospital stay. Removal rigid dressing (RRD) has been used since 1970.¹ Various studies have shown its effectiveness in primary wound healing and shorter hospital stay.^{2,3} However, controversies continue and some study did not demonstrate its benefits.⁴ Early RRD plaster casts promote rapid healing, prevents knee contractures, facilitates inspection, shorter rehabilitation and hospital stays.⁵ The RRD also reduces time to fitting of a prosthesis.⁶

Locally, there is no consensus between these two dressings, and in this study we aim to compare the SSD vs RRD after trans-tibial BKA in terms of wound healing and hospital stay.

Methods

Thirty-seven consecutive BKA patients were included in this study from January 2012 to January 2018 from the Shree Bhawani Hospital and Research Centre Birgunj, Nepal. Informed consent was obtained. The amputees were randomly allocated by ballot into two groups, the SSD and RRD. Institutional approval was obtained.

All patients who had equal flaps technique BKA at the level of mid-leg were included. Inadequate follow-up (<2 month) and diabetic were excluded. Routine antibiotics and supportive treatments were as per hospital protocol.

The SSD consisting of gauze, wool pad, crepe bandage was applied in theatre. The RRD was applied in theatre or in the recovery room within 20 minutes of wound closure as described in the literature.^{3,4} The surgical finishing details were standardized across both groups. The SSD was changed from time to time when it was soaked from wound discharge. Drain was removed after 48 hours in all cases. In RRD patients, a window was made at the stump dressings for observation of the wound when there was soakage, pyrexia, chills and rigors or rapid pulse. In case of hematoma or pus, the plaster was removed for treatment accordingly, and a back slab applied. If the patient had no complain, the cast was removed at 10 days, stitches removed, and discharged with the advice to do quadriceps exercises and flexion and extension exercise still prosthesis fitting. Patient in both groups were given elastic crepe bandage for the stump till prosthesis fitting. Crepe bandage was used only during day time. Independent t-test was used to analyse for differences between the two groups. The p value <0.05 was considered significant.

Results

There were 20 BKA patients in SSD group and 17 in RRD group. The age ranged from 10 -70 years. Average age was 41 years in SSD and 37.7 years in RRD.

In SSD, 2 of 20 (10%) wounds healed primarily. In RRD, 13 of 17 (76.47%) healed primarily. The P value <0.001, was highly significant, (Table 1). In SSD, primary healing time of wound were 23±1.41 days and in RRD 16.21±2.69 days, (Table 2). Average length of hospitalization in SSD was 35.2 days (range 22-49), and in RRD 18.4 days (range 12-31), (Table 3).

Table 1. Primary and secondary healing rate of stump after soft stump dressing (SSD) and removal rigid dressing (RRD) in below knee amputation (BKA), n=37

Groups	Primary healing No (%)	Secondary healing No (%)	p
Soft dressing SSD(20)	2 (10.00)	18 (90.00)	<0.01
Rigid dressing RRD(17)	13 (76.47)	4 (23.53)	<0.001

Fisher's exact test

Table 2. Primary and secondary healing time (day) of stump after SSD and RRD in BKA, n=37

Groups	Primary healing (day)		Secondary healing (day)		p
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Soft Dressing SSD (20)	23±1.41	36.56±4.53			<0.01
Rigid Dressing RRD (17)	16.21±2.69	26.50±3.42			<0.001

Unpaired Student's t test

Table 3. Length of hospitalization (day) after SSD and RRD in BKA, n=37

Groups	Hospitalization Days		p
	Mean ± SD	Range	
Soft dressing SSD (20)	35.20±5.29	22-49	
Rigid dressing RRD (17)	18.41±5.5	12-31	<0.001

Unpaired Student's t test

Discussions

In our study the primary healing of the BKA stump in SSD group was 2 of 20 (10%) and secondary healing 18 of 20 (90%), comparatively poor results than RRD group with primary healing of 13 of 17 (76.47%) and secondary 4 of 17 (23.53%).

Similar findings were observed in BKA with 58% primary healing in soft dressing and 66% in rigid dressings.¹ There was a significant difference between the groups in terms of time from amputation to rehabilitation, from amputation to prosthetic fitting and total length of hospital stay. Similar results in BKA were observed for effectiveness of soft versus rigid dressing in the elderly patients with vascular diseases.³

The hospital stay in present study was longer (average 35.2 days, range 22-49) with SSD than RRD (18 days, range 12-27). Similarly, the patients treated with soft dressing stayed in hospital for 71 days and with rigid dressing 26 days.¹ Other researchers have also demonstrated a reduction in inpatient stay with RRD.^{2,6} However, the overall total hospital stay in present study is shorter than above mentioned studies.^{1,3}

Our result supports the view that RRD and ambulation do not deter wound healing and probably are a positive factor for acceptance of the prosthesis, both physically and mentally. Limitation of this study is small sample size to

analyze the effect of two dressings for different causes of amputations and for specific age groups. Further research may be indicated to confirm these results with a large sample.

Conclusions

The primarily wound healing and length of hospital stay after below knee amputation was better in rigid dressing RRD group in comparison to soft dressing SSD.

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