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Bupivacaine Moistened Dressing for Pain Relief on Skin Graft Donor Sites

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Abstract

Background: **Pain at the split-thickness skin graft donor site has been a great trouble for some patients especially during the first five postoperative days. Many types of dressings have been used for split skin graft donor site especially in the last twenty years period but it could not provide the effective pain relief for prolonged period.**

Patients and Methods: **After approvals by the ethics committee of the Faculty of Medicine, Siriraj Hospital, Mahidol University, the study was conducted from December 2000 to December 2001. Forty patients, without previous history of local anesthetic allergy, who required split-thickness skin graft for reconstruction of various defects were prospectively studied. The patients were randomly divided into two groups. Group A received bupivacaine moistened dressing and 0.5% bupivacaine hydrochloride 6 ml/100 cm^2 instilled via catheter every 12 hours under aseptic technique. Group B was a control group, had saline moistened dressing and saline 6 ml/100 cm^2 instilled in the same method and intervals.**

Results: **There was no significant difference between the two groups in ages, sex, distribution of disease requiring reconstruction. The donor size was 295 cm^2 for group A and 225 cm^2 for group B. Pain relief scores in both groups assessted on each day of the first five days were significantly different between the two groups. First to forth day pain relief scores showed p value < 0.001. Fifth day scores showed p value < 0.05. Bupivacaine moistened dressing on skin graft donor site can be done safely and satisfactory post operative analgesia can be achieved.**

Pain at the split thickness skin graft donor site can be a real trouble for some patients especially during the first five post-operative days. Many types of dressings had been used for split skin graft donor sites in the past period but it could not provide the effective pain relief for an extended period. The purpost of this study is to demonstrate the effectiveness of bupivacaine moistened dressing for prolonged pain relief at the skin graft donor site.

Patients and Methods

The proposed study was approved by the ethics committee of the Faculty of Medicine Siriraj Hospital, Mahidol University. The study was conducted from December 2000 to December 2001. Forty patients over 20 years old underwent harvested split thickness skin graft for various types of reconstructive surgery were prospectively studied. The mean age was 41 and 31

years in group A and B respectively. All patients had no history of local anesthetic drug allergy. The patients were randomly divided into two groups. The thigh donor site was only included in the study. Group A received bupivacaine moistened dressing with 0.5% bupivacaine hydrochloride 6 ml/100 cm^2 instilled via a catheter every 12 hours under aseptic and antiseptic techniques. Group B, a control group, received saline moistened dressing with saline 6 ml/ 100 cm^2 instilled in the same method and intervals.

The split thickness skin graft was harvested with air driven dermatome. The wound was first covered with a layer of calcium alginate[1] acting to absorb the instilled test solution for continuous release to the wound. A catheter was placed on the calcium alginate and covered with gauze and steridrape to prevent contamination.[2] And the outer most cover was the elastic bandage (Figure 1).

For the assessment of pain, the patients were interviewed using numeric pain intensity scale (Figure 2) at 24, 48, 72, 96 and 120 hours. Zero represents no pain and 10 means severe pain and the pain scores were recorded both before and after drug administration each day. The difference between pain score before and after drug administration was recorded as the pain relief score.

Other information including demographic data and analgesic drug requirement, pethidine and acetaminophen were recorded.

The Paired T-test and Repeated measurement (ANOVA)[3] were employed for statistical analyses. Calculation for sample size was made according to Tetzlaff et al.[1]

Results

There was no significant difference between two groups in ages, sex, distribution of disease conditions requiring split thickness skin graft for reconstruction of defects, and donor site area. The donor sites of group A and B were 295 cm^2 and 225 cm^2, respectively (Table 1 and Figure 3). The means of pain relief scores in both groups on each day of the first five days showed that pain relief scores of all 5 days postoperative

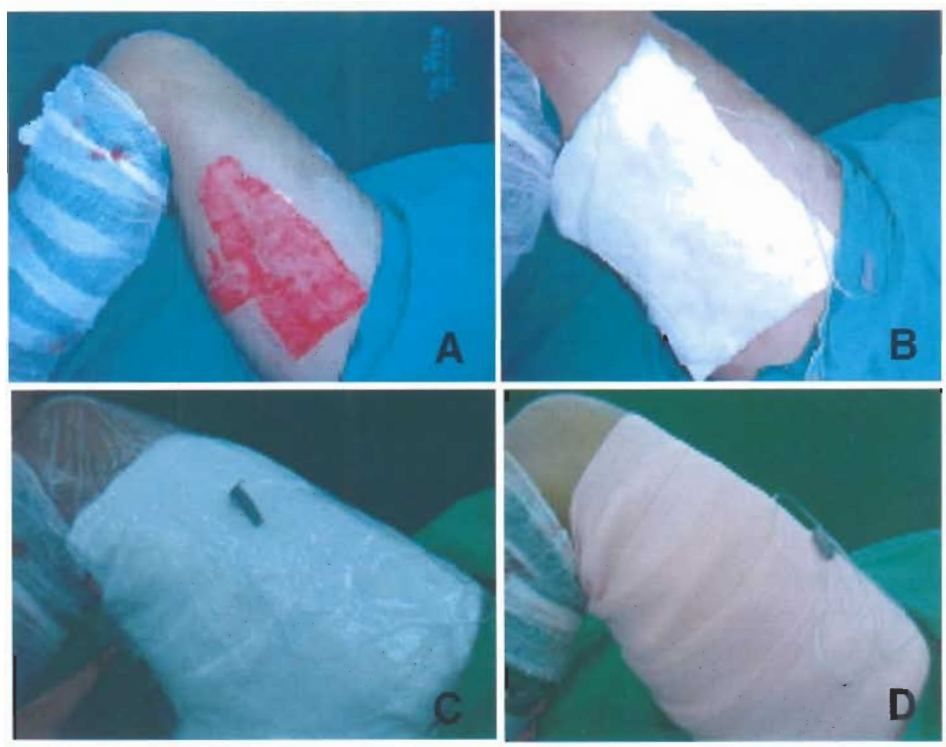


Fig. 1 A. Donor site wound.
B. Initial wound cover with a layer of calcium alginate.
C. Catheter and guaze dressing under steridrape to prevent contamination.
D. Wound dressing secured with elastic bandage.

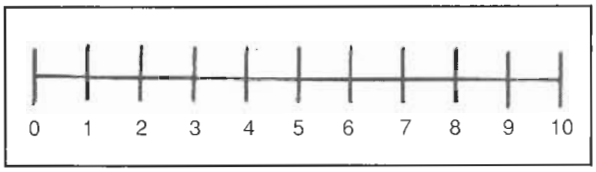


Fig. 2 Numeric pain intensity scale.

Table 1 Demographic data.

	Bupivacaine (Group A)	Saline (Group B)
Male	10	8
Female	10	12
Mean age (yr)	41	39
Mean donor site area (cm^2)	295	225

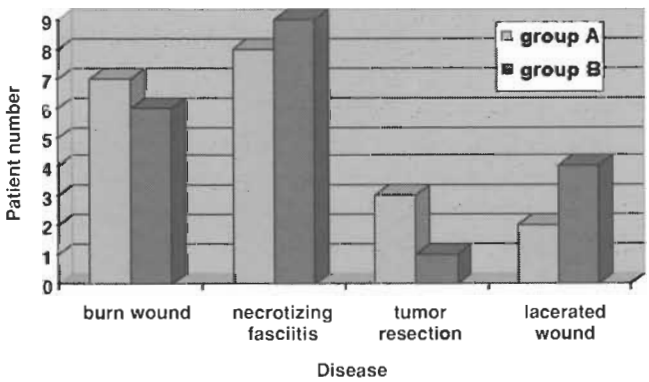
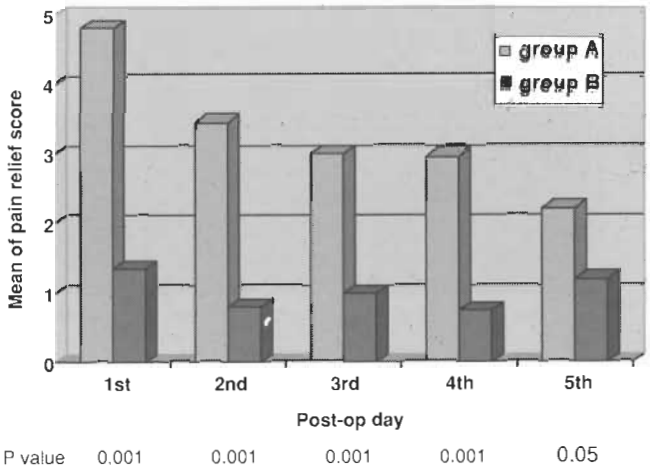


Fig. 3 Distribution of disease conditions requiring split thickness skin graft reconstruction of defects.



P value	0.001	0.001	0.001	0.001	0.05

Fig. 4 Mean of pain relief score.

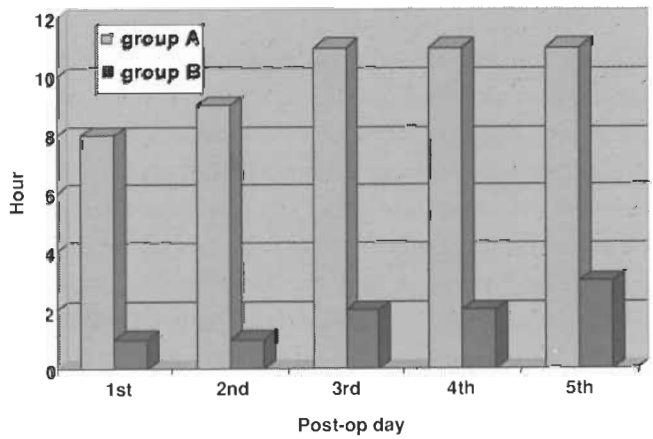


Fig. 5 Mean of pain relief duration.

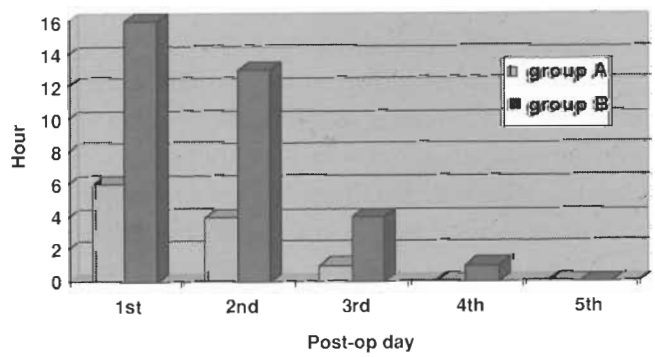


Fig. 6 Pethidine requirement for pain relife at donor site.

period compare each day was significant difference between two groups. First to forth day pain relief scores showed p value < 0.001. Fifth day scores showed p value < 0.05. It was clearly shown that the pain relief score was significantly higher in group A than group B.

For the pain relief duration of each of the five days. During the first five days, pain relief duration in group A was much prolonged than in B. It was approximately 8-11 hours in group A (Figures 4, 5).

Regarding pethidine requirement for pain relief at donor site in saline group, 16 patients asked for pethidine on the first day and 13 patients on the second day but in bupivacaine group only 6 patients asked for it on the first day and 4 on the second day but acetaminophen requirement for pain relief at donor site varied in both groups (Figures 6, 7).

Four patients from bupivacaine group had complaint about pain during bupivacaine administration for 3-5 minutes. No patients in both groups had wound infection or delayed wound healing.

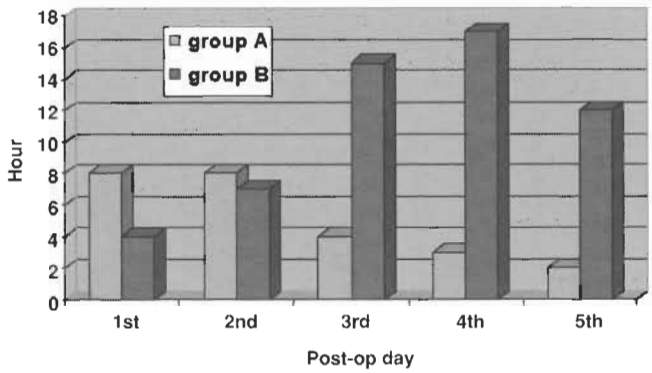


Fig. 7 Acetaminophen requirement for pain relief at donor site.

Discussion

This study demonstrated the effectiveness of bupivacaine moistened dressing for pain relief on skin graft donor site. Many techniques of reducing pain at the donor site wounds were developed such as topical dressing with anesthetic cream but they could not provide the effective pain relief for prolonged period.[5-8] One advantage of this method, in the situation that the patient had pain, is that the bupivacaine could be instilled via catheter as frequently as required. Moreover this technique can be applied with the patient control anesthetic method with limitation of dosage. It was not more than 3 mg/kg/dose and not less than 6 hours interval to prevent the systemic toxicity of the drug. Alvi et al demonstrated that after application of bupivacaine at the wound, the drug concentration in plasma was not more than toxic level,[9] so bupivacaine moistened dressing is safe too.

Topical bupivacaine applied to skin graft donor site produced an analgesic effect that reduces narcotic requirements compared with the patients who received placebo. The benefits of this technique will help the patient ambulate earlier with only the use of local anesthetic drug and reduce side effects of analgesic drug. However, this method still has some disadvantages. Firstly, the dressing has to be changed frequently and care must be taken during drug administration to prevent wound contami-nation. Secondly, the patients in bupivacaine group had complaint about pain during drug administration. Pain may be caused by positioning of the catheter, the force of instilled drug or the low pH of bupivacaine. However, this problem may be reduced by checking the position of the catheter again before wound coverage, sodium bicarbonate buffering to decrease the pain in local anesthetic solution, and slow release of bupivacaine. This method of dressing can also be applied in minor burn patient[10] because characteristic of burn wound is similar to donor site of skin graft.

Summary

Bupivacaine moistened dressing on skin graft donor site can be done safely and achieve satisfactory post operative analgesia.

REFERENCES

1. Barnett A, Berkowitz RL, Milis R, Vistness LM. Comparison of synthetic adhesive moisture vapor permeable and fine mesh gauze dressing for split thickness skin graft donor sites. Am J Surg 1983; 145: 379-81.
2. James JH, Watson ACH. The use of opsite, a vapour permeable dressing, on skin graft donor sites. Br J Plast Surg 1975; 28: 107-10.
3. Schouten JJA. Planning group sizes in clinical trials with a continuous outcome and repeated measures. Statistics in Medicine 1999; 18: 255-64.
4. Tetzlaff JE, Andrish J, O'Hara J, et al. Effectiveness of bupivacaine administered via femoral nerve catheter for pain control after anterior cruciate ligament repair. J Clin Anesth 1997; 9: 542-5.
5. Owen TD, Dye D. The value of topical lignocaine gel in pain relief on skin graft donor site. Br. J Plast Surg 1990; 43: 480-2.
6. Jellish WS, Gamelli RL, Furry PA, et al. Effect of topical local anesthesia application to skin harvest sites, for pain management in burn patients undergoing skin-grafting procedure. Ann Surg 1999; 299: 115-20.
7. Butler PEM, Eadle PA, Lawler d, et al. Bupivacaine and kaltostat reduces post-operative donor site pain. Br J Plast Surg 1993; 46: 523-4.
8. Das SK, Munro IR. Painless, wettable split skin graft donor site dressing. Ann Plast Surg 1981; 7: 48-53.
9. Alvi R, Jones S, Burrows D, et al. The safety of topical anesthetic and analgesic agents in a gel when used to provide pain relief at split skin donor sites. Burns 1998; 24: 54-7.
10. Bettinger D, Gore D, Yvonne Humphries. Evaluation of calcium alginate for skin graft donor site. J Burn Care & Rehabil 1995; 16: 59-61.