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A comparative study of calcium sodium alginate (Kaltostat®) and bismuth tribromophenate (xeroform®) packing in the management of epistaxis

J. A. McGLASHAN, F.R.C.S., R. WALSH, M.B., B.S., A. DAUOD, M.B., B.S., A. VOWLES, M.B., B.S., M. J. GLEESON, F.R.C.S.

Abstract

A prospective study was undertaken to compare the efficacy of calcium sodium alginate fibre (Kaltostat®) to petrolatum gauze impregnated with bismuth tribromophenate (Xeroform®) for the control of epistaxes that require hospital admission.

Forty patients presenting with severe epistaxis requiring hospital admission were treated with either Kaltostat® or Xeroform® nasal packs. Allocation to either treatment group was made randomly. The composition of each group in terms of age, sex distribution, aetiology of epistaxis and severity of bleed was not significantly different.

There was no significant difference in the efficacy or patient acceptability of either therapeutic agent. It is concluded that calcium sodium alginate fibre should be considered as an acceptable alternative to traditional gauze packing.

Introduction

Epistaxis is one of the most common nasal emergencies. While most are trivial and stop spontaneously or following cautery, many are not and require hospital admission. Nasal packing has been recognized as the principal primary treatment for moderately severe epistaxes since it was first documented by Hippocrates in the fifth century BC (Stell, 1977; Hara, 1962; John *et al.*, 1987; Shaheen, 1987). Nowadays, ribbon gauze impregnated with petrolatum and frequently antiseptics in addition, is most widely used for nasal packs. These packs act by maintaining pressure on the ruptured blood vessel within the nasal mucosa allowing thrombus to form and become organized. The insertion of these packs is unpleasant for the patient and requires a certain amount of skill on behalf of the attendant clinician. Many fail merely because they have been poorly placed or too little gauze has been inserted; alternatively deviation of the nasal septum may preclude placement of enough packing. Coagulation defects and untreated hypertension may be responsible for other failures (Jackson and Jackson, 1988). Packing is not without other significant complications, for example hypoxia, infection and trauma (Fairbanks, 1986).

Alginates have been used as wound dressings since the 1940s and for epistaxis control in the form of an absorbable swab (Calgitex®) up until the 1970s (Martindale, 1977). No clinical trials of Calgitex® have been reported in the English literature and this product was discontinued because of high production costs (Thomas, 1990). Recently there has been a resurgence of interest in the use of calcium sodium alginate preparations for wound dressings and haemostasis following more recent studies on wound healing and due to improvements in production techniques (Thomas, 1990). As a non-woven, biocompatible fibre, it is highly absorbent and forms a viscous hydrophilic gel on contact with blood. This gel conforms easily to the contour of any wound and stimulates haemostasis by releasing calcium ions to promote platelet activation and whole blood coagulation (Blair *et al*, 1988). This study was designed to assess the suitability of this material (Kaltostat®) for use as an alternative to standard packs Xeroform® (petrolatum gauze impregnated with bismuth tribromophenate) for the control of epistaxes.

Materials and methods

Forty consecutive patients who presented with significant epistaxes of at least two hours duration were recruited into this prospective, single centre, trial. Patients were only excluded from the trial if they were under 16 years old, pregnant, had a haemorrhage following nasal surgery or declined to take part. Patients taking anticoagulant or non-steroidal anti-inflammatory drugs were considered eligible. Patients were placed into either the Xeroform® (petrolatum gauze impregnated with bismuth tribromophenate) or Kaltostat® (calcium sodium alginate fibre) pack groups according to a sequential treatment schedule, produced randomly by an independent agent and stored in a series of sealed envelopes. A *No Treatment* arm was not written into this protocol as many patients were thought likely to have had either serious loss of blood or previous admissions for epistaxes. In either eventuality, delay in treatment was thought to be unethical.

From the ENT Department, Lewisham Hospital and the Moorgate Laboratory, Department of Surgery, Guy's Hospital, London.
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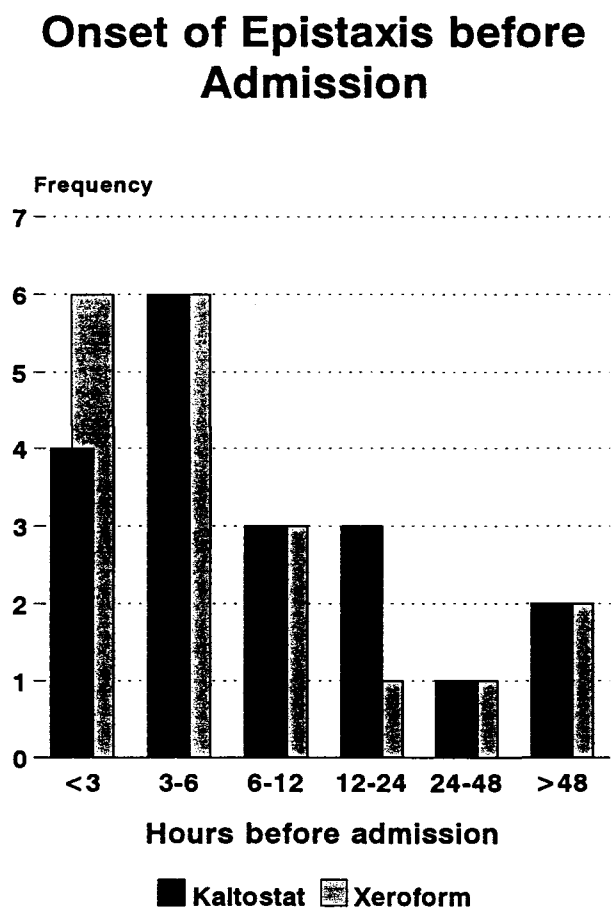

FIG. 1

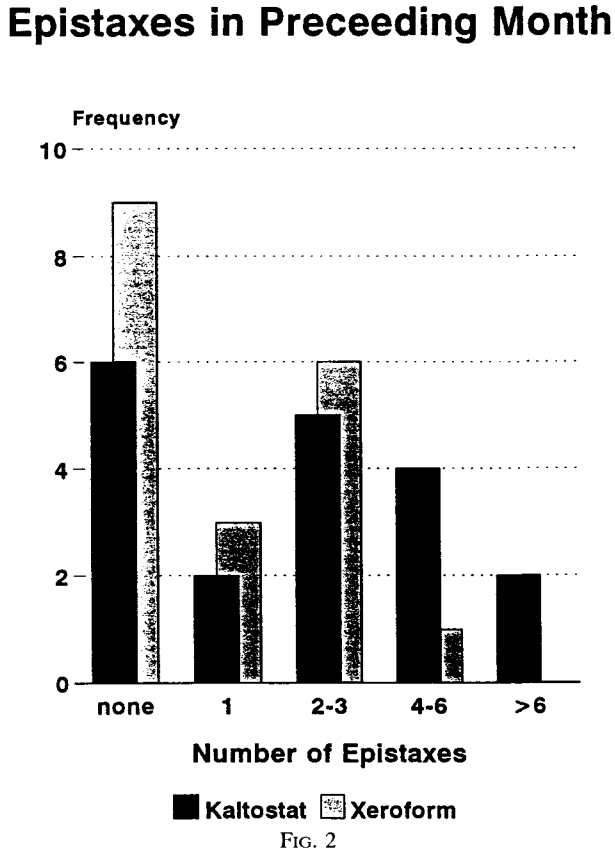

FIG. 2

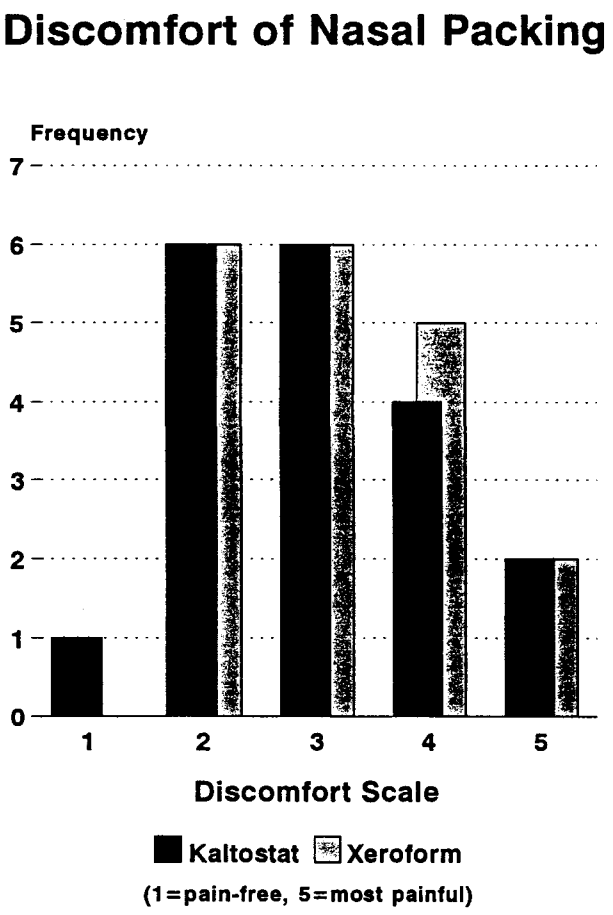

FIG. 3

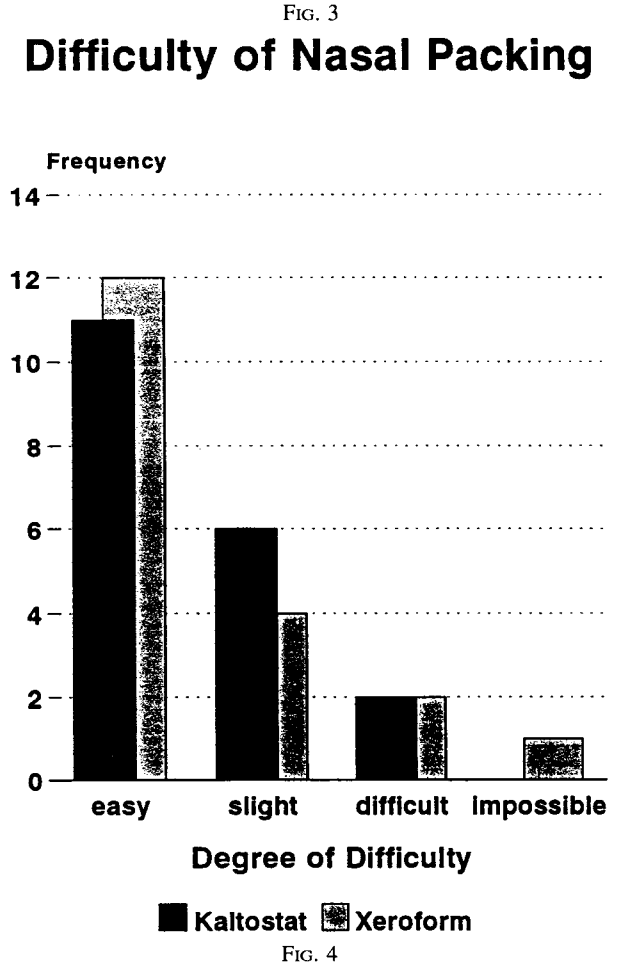

FIG. 4

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TABLE I
PATIENT DETAILS

	Sex M:F	Age Mean range	Pulse rate Mean range	Systolic pressure Mean range	Diastolic pressure Mean range
Kaltostat®	8:11	67 (16–93)	86 (68–100)	154 (90–210)	92 (70–130)
Xeroform®	11:8	64 (28–88)	86 (66–130)	153 (110–210)	95 (90–126)

The nasal packs were inserted by ENT senior house officers, all of whom were competent in their placement. They were inserted using a standardized procedure after the application of 10 per cent cocaine solution on ribbon gauze to the nasal mucosa. First, a pack was inserted on the side of the initial haemorrhage, but if control was not achieved immediately, another pack was inserted in the contralateral nasal cavity. Patients were restricted to bed, sedated with 2 mg diazepam 8 hourly, and given either 250 mg amoxycillin 8 hourly, or 250 mg erythromycin 6 hourly, until the pack was removed. If bleeding was not controlled within one hour of insertion of the pack, further treatment was given and recorded. The packs were removed 24–36 hours after haemostasis had been achieved and the patient discharged later that day.

The patient's history, nasal anatomy and pathology, vital signs and blood indices throughout their hospital course were recorded. In addition, the doctors' and patients' perception of the degree of difficulty and discomfort and discomfort of nasal packing and its removal were assessed using a 5 point visual analogue scale.

All patients were given appointments for review and examination. This was conducted by an independent observer six weeks after discharge and any complications recorded. The data was entered onto a spreadsheet and analyzed using the SAS® statistical programme.

Results

For simplicity, the results are presented under the following headings: history and examination, treatment and laboratory results, doctor and patient assessment, and complications at follow-up. One patient from each treatment group failed to complete the trial according to the protocol and had to be excluded from the analysis.

History and examination

There was no significant difference between the groups in their age and sex (Table 1), or in their medical histories; 45 per cent had a pre-existing cardiovascular disease for which they were being treated. 74 per cent of the patients had been bleeding for more than three hours before admission and 42 per cent in excess of six hours (Fig. 1). 61 per cent had experienced minor epistaxes in the preceding month (Fig. 2). 55 per cent of epistaxes were considered to be idiopathic and 26 per cent of patients were currently taking non-steroidal anti-inflammatory or anticoagulant medications (Table II). 18 per cent of the patients had sustained previous epistaxes that required outpatient cautery or hospital admission for their control. 26 per cent had a nasal abnormality which was felt to have and influence of their management, for example, deviation of the nasal septum or sepsis. There was no significant difference in either the mean admission pulse rates or blood pressure (Table 1). The epistaxis was arising from the anterior part of the nasal septum in 24 per cent of the patients but could not be defined in 63 per cent (Table III).

TABLE II
CAUSE OF EPISTAXIS

Cause	Kaltostat®	Xeroform®
Idiopathic	9	12
Infection	1	3
Medication	7	2
Trauma	0	1
Miscellaneous	1*	1**
>1 factor	1†	0

* = Alcoholic cirrhosis.
** = Septal perforation.
† = Non-steroidal anti-inflammatory + septal perforation.

Treatment and laboratory results

There was no significant difference in the response to treatment in either group, or in the severity of their epistaxes as judged by their need for fluid or blood replacement and laboratory investigations. In 63 per cent of patients it was necessary to insert bilateral packs (Table IV) and one from each group required blood transfusion. Of the seven patients who required further treatment (Table V), three were hypertensive and two patients were taking small doses of non-steroidal anti-inflammatory drugs. No other recognized factor which might have affected control of epistaxes could be identified in the other two patients. The mean length of hospital stay was three days for both treatment groups.

Doctor and patient assessment

There was no significant difference between the treatment groups in the patients' perception of the discomfort

TABLE III
SITE OF EPISTAXIS

Site	Kaltostat®	Xeroform®
Anterior septum	5	4
Other	3	2
Undefined	11	13

TABLE IV
TYPE OF NASAL PACK INSERTED

	Unilateral	Bilateral
Kaltostat®	8 (42%)	11 (58%)
Xeroform®	6 (32%)	13 (68%)

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TABLE V
FURTHER INPATIENT TREATMENT

	Kaltostat®	Xeroform®
None	15	17
Anterior pack	3	1
Anterior + posterior packs	1	1
Septoplasty + anterior pack	0	1

associated with packing. 10.5 per cent from each group reported that it was most painful while less than a third found it only mildly uncomfortable (Fig. 3). Similarly the senior house officers found both materials equally easy to use (Fig. 4). Pack removal also caused some discomfort but this was not as severe as that produced by insertion and was of similar magnitude for both packing materials (Fig. 5). Five patients in the Kaltostat® group sneezed their packs out but this was not attended by further haemorrhage. Complete removal of the Kaltostat® pack proved slightly difficult in two additional patients because of fragmentation but no residual pack was seen at follow-up.

Complications at follow-up

Nine patients failed to attend for review, two of whom had died from unrelated causes. Eight of the patients in the Kaltostat® group experienced further epistaxis in the six weeks following their discharge in comparison to four in the Xeroform® group. This difference was not significant (Table VI). There were no major complications seen at six weeks (Table VII) and both the adhesions and mucosal ulceration were slight. There was no subjective diminution in the sense of smell in either group.

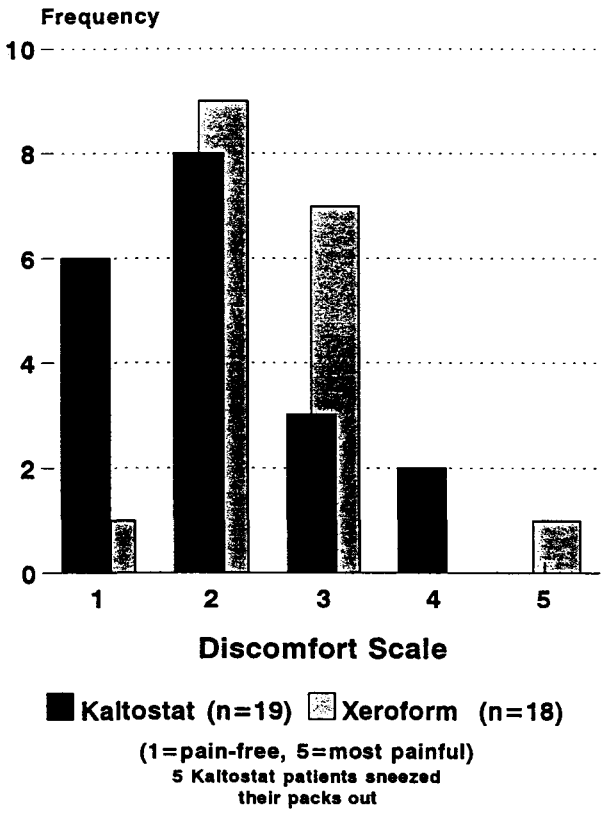

FIG. 5

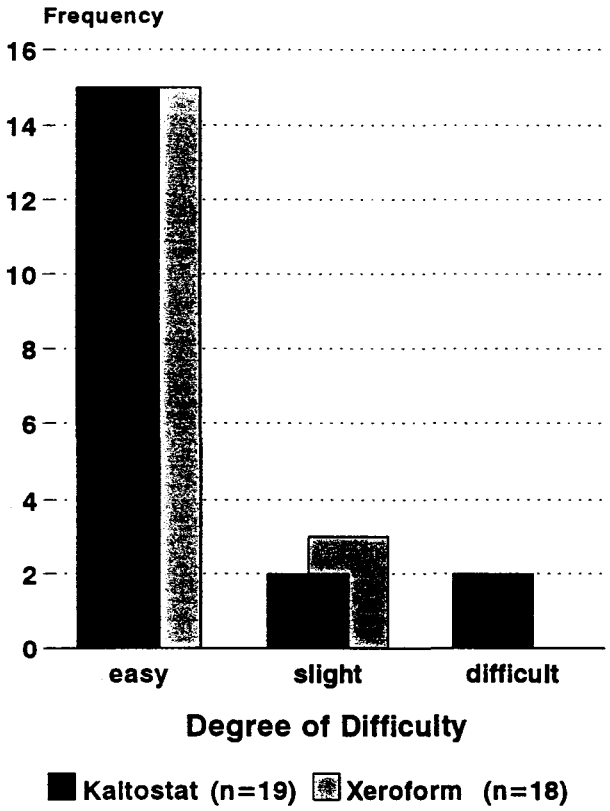

FIG. 6

Discussion

It seems unlikely that any primary therapy other than anterior nasal packing will be introduced for the control epistaxes in the first instance are usually the least experienced, for example casualty officers or general practitioners, with often poor facilities for nasal examination. Although our experienced staff failed to find Kaltostat® easier to handle than Xeroform®, they did find it equally

TABLE VI
FURTHER EPISTAXES ON DISCHARGE

Severity of epistaxes	Kaltostat® (n = 14)	Xeroform® (n = 15)
Minor—treated at home	7	1
Required outpatient treatment	0	1
Required readmission and treatment	1	2

TABLE VII
COMPLICATIONS OF NASAL PACKS

	Incomplete removal	Adhesions	Mucosal ulceration
Kaltostat®	2*	2†	3†
Xeroform®	0*	1††	1††

n* = 19, n† = 14, n†† = 15.

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effective. The Kaltostat® fibre dressing had to be divided longitudinally into three pieces before it could be inserted into the patient's nose. If the presentation of this material were improved to enable easier insertion and removal, it would be more suitable for emergency use.

There was no significant difference in the complications experienced by both groups although complete removal of the Kaltostat® was not achieved in two cases. At six weeks however there was no evidence of residual pack and no complications had ensued. Installation of saline nose drops might have been effective as prior moistening of the dressing is recommended in other sites (Thomas, 1990); this has also been noted to reduce the discomfort experienced by patients. Adequate nasal packing with ribbon gauze is an unpleasant and painful procedure for patients in spite of prior application of topical anaesthetics. That Kaltostat® was equally unpleasant was surprising as it is not necessary to pack this material tightly.

Sneezing is not an infrequent side-effect of nasal packing because of local irritation. The expulsion of the five alginate packs is probably a reflection of the lack of friction between the gel and the nasal mucosa and interestingly did not result in further epistaxes. This emphasizes the need for further research to take advantage of its potential for spontaneous expansion into the nasal cavities when moistened and of its haemostatic qualities. It may prove to be advantageous in patients with clotting disorders, blood dyscrasias or, for example children with leukaemia.

No other controlled trials of alginates in the treatment of spontaneous epistaxes have been published, in spite of its previous widespread use (Thomas, 1990). Sirimanna (1989) published a pilot study (32 nostrils) using Kaltostat® for packing the nasal cavity after trimming of the inferior turbinates. No bleeding was reported while the packs were in situ or after their removal at 36–48 hours. All packs but one were removed intact.

In conclusion this study has shown that Kaltostat® is an effective agent in the management of moderately severe epistaxes but in its present form does not appear to offer any significant advantage over ribbon gauze packing.

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Address for correspondence:
J. A. McGlashan,
ENT Department,
Guy's Hospital,
SE1 9RT.

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