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ASPECTS OF TREATMENT*

Balloon tamponade in the management of bleeding oesophageal varices

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Summary

Sixty-three patients with acute variceal haemorrhage were treated with the Sengstaken–Blakemore tube (SBT). Bleeding was initially controlled with the gastric balloon in 37 patients (60%) and with both gastric and oesophageal balloons in another 17 (27%), giving overall primary success in 54 patients (87%). Sixteen (26%) patients re-bled within 24 hours of deflation of the tube. Repeat balloon tamponade helped in controlling bleeding in 9 of these. Thus, a total of 47 (75%) patients stopped bleeding with SBT. There was no mortality. The only major complication was pulmonary infection (15%), which improved with antibiotics. Use of the SBT was found to be simple, quick, low cost and attended with few complications. Its use is recommended in patients with acute variceal bleeding, especially in developing countries with limited resources.

Introduction

Since its introduction in 1950, the Sengstaken–Blackemore tube (SBT) *(1)* has been one of the most widely used non-surgical procedures for the arrest of haemorrhage from varices by direct tamponade. Its effectiveness has been reported to be from 50 to 92% *(2–4)*. The frequency and seriousness of complications associated with its use have also been variably reported *(2–5)*. Despite the accumulated experience with the use of SBT, there remains a controversy about its usefulness compared with other non-surgical methods of stopping bleeding such as the use of intra-arterial or intravenous pitressin *(6,7)*. However, we feel that in tropical countries the advantages in its use much outweigh the complications and this communication evaluates its utility in a large hospital in India.

Materials and methods

Sixty-three patients with acute variceal haemorrhage admitted to the Department of Gastroenterology, at the All India Institute of Medical Sciences, New Delhi, who were treated with SBT tamponade, were included in this study. Variceal bleeding was confirmed in all the patients by endoscopy. Portal hypertension was due to hepatic cirrhosis in 14, extrahepatic obstruction in 16 and non-cirrhotic portal fibrosis in 33 patients.

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The Editor would welcome any comments on this paper by readers

* Fellows and Members interested in submitting papers for consideration for publication should first write to the Editor

INTUBATION TECHNIQUE EMPLOYED

We used the conventional tube (PORGES, 7859–021) which has two balloons and three channels. Prior to insertion, the patency of both the balloons was checked by air inflation. The tube was introduced, after lubrication, through the nose and passed into the stomach. After confirming the position of the gastric balloon in the stomach, it was inflated with 200–250 ml of air using 50 ml syringe. The gastric balloon inlet was then doubly clamped. Simultaneous auscultation was performed over the epigastrum to confirm the position of balloon in the stomach. Non-weighted external traction was applied and the gastric balloon pulled taut against the cardia and the tube fixed to the patient's nose over a sponge pad. The position of the gastric balloon was checked by an immediate X-ray of the abdomen.

When required, the oesophageal balloon was inflated to a pressure of about 40 mmHg and its inlet was also doubly clamped.

The pressure in the oesophageal balloon was checked at 4-hour intervals. Suction of oesophageal secretions was performed with the help of a nasal catheter. Gastric aspiration was done at 2-hour intervals. The whole procedure of the insertion and maintenance of the tubes was undertaken by trained senior residents of the department.

Initially, the gastric balloon alone was inflated. If haemostasis was not achieved, the oesophageal balloon was inflated. The balloons were kept inflated for a maximum period of 72 hours. General resuscitative measures were carried out in each patient. The tube was kept in the stomach after deflation for another 24 hours and was then used as an ordinary intragastric tube. In case of re-bleeding rapid reinflation was possible. The same tube was used in successive patients and could be used on as many as ten occasions without difficulty.

Results

The SBT was successfully passed in 62 of the 63 patients. In 1 case, due to marked deformity of the nasal septum it was not possible to pass the tube.

CONTROL OF BLEEDING

Primary control was considered to have been achieved when, soon after the passage of the SBT, bleeding stopped and remained so whilst the tube was in position.

Failure was considered when, despite inflation of both the balloons, the variceal bleeding continued.

Re-bleeding was defined as bleeding recurring within 48 hours of deflation of the balloons.

Overall efficacy was assessed 48 hours after deflation of the balloons.

The SBT was re-used in cases of primary success followed by re-bleeding.

INCIDENCE OF SUCCESS

The initial control of bleeding was achieved in 54 (87%) patients. In 37 (60%) inflation of the gastric balloon alone was sufficient and in 17 (27%) control of bleeding was only achieved after the addition of oesophageal balloon tamponade. The SBT failed to control the bleeding in 8 (13%) cases.

Of the 54 succesful tamponades, re-bleeding (within 48 hours) occured in 16 (26%) patients. The SBT was reintroduced with success in 9 (14%). Thus the SBT was successful in controlling variceal bleeding in 47 of the 63 patients (75%).

The tube was kept in position for a mean period of 38.7 hours, with a range of 16–72 hours.

COMPLICATIONS

All patients found oesophageal tamponade uncomfortable. The various complications recorded are given in Table I. None of the complications were fatal. Pulmonary infection following aspiration of bloody gastric contents was the major complication. Rupture of the gastric balloon which followed repeated use of the same tube was encountered in 10% of the patients.

TABLE I *Complications associated with the use of SBT*

No.	*Complication*	*No. of patients (n = 62)*
1	Pulmonary infection	9
2	Rupture of gastric balloon	6
3	Nasal cartilage injury	7
4	Nasal excoriation	33
5	Retrostenal pain	5
6	Hypotension	1
7	Nasopharyngeal bleeding	4

Minor nasal problems and complication were seen in 64% of cases. The frequency and extent of nasal excoriation increased with prolonged intubation.

Discussion

Oesophageal tamponade for the control of variceal haemorrhage was first used by Westphal who, in 1930 applied local pressure by means of an oesophageal sound. Later an inflatable modified Miller–Abbott tube was used by Rowntree *et al. (8)* in 1947. The introduction by Sengstaken and Blakemore of a tube with two balloons enabled local compression of bleeding varices by both oesophageal and gastric balloons. Its use has been found effective by almost all the workers, though attended by complications.

In our hands, the SBT was effective in achieving primary haemostasis in 87% and overall haemostasis in 75% of cases. Initial success has been reported to be 84%, 86% and 92% and overall success 26%, 38% and 76% by Read *et al. (5)*, Teres *et al. (9)* and Pitcher *(3)*. Our results compare favourably with these series. In previous series the effectiveness of gastric and oesophageal balloons has not been individually studied. Most of the variceal bleeds occur from rupture of the varix at the gastro-oesophageal junction. The gastric balloon is likely to compress the oesophageal varices only partially and inflation of an oesophageal balloon may become necessary. In our series, primary success was achieved with the gastric balloon alone in 60% of cases. In another 27% of cases success was achieved following oesophageal balloon compression. Inflation of the oesophageal balloon was thus not necessary in all the cases, as recommended by some workers *(4,9)*. In practice, we inflate the oesophageal balloon only when, despite careful tamponade by a properly inflated and placed gastric balloon, the bleeding continues.

Generally balloon inflation and traction is maintained for 24–48 hours. The optimum duration of balloon inflation is not known but we have usually kept the tube inflated for 24–48 hours and rarely for up to 72 hours. We then first deflate the oesophageal and then the gastric balloon.

The frequency of complications reported with the use of SBT has been variable *(2–5,8)*. Conn and Simpson *(2)* reported a high incidence of complications associated with the use of SBT. In their 40 patients, major complications were noticed in 14 (35%) and death attributed to the use of SBT was reported in 9 (22%) patients. Regurgitation of gastric contents in 6, oesophageal rupture in 2 and airway obstruction in 1 were amongst the fatal complications. Almost similar observations were made by Read *et al. (5)*. Pitcher *(3)*, after carefully analysing the nature of complications, proposed a number of suggestions to avoid them. These consisted of routine application of nasopharyngeal aspiration, emptying the stomach prior to the passage of the SBT and close monitoring of the inflated tube. In his series of patients these precautions helped to reduce complications significantly.

In our series the major complication was also pulmonary infection. It was present in 15% of the cases. It was, however, possible to control the infection in all the cases with the help of antibiotics. Infection was noticed to be more frequent in cases with longer duration of balloon inflation. The incidence of nasal excoriations was high in our series (52%). There was no residual nasal deformity. Nasal bleeding which was occasionally encountered during intubation was usually mild and did not deter us from passing the tube in any patient. Many workers like Pitcher *(3)* and Mitchell *et al. (4)* prefer the oral route for intubation. Teres *et al. (8)* compared the efficacy of 500 g of traction applied to the tube with simple fixation of the tube to the nose. There was better tolerance and greater efficacy when the SBT was used without external traction.

The incidence of oesophageal mucusal ulcerations has gradually decreased with refinement in techniques. Development of oesophageal ulceration has not been found dependent on the duration of intubation *(5)*. In the present series this complication was not encountered.

In a developing country like India the cost of procuring a new SBT for each patient with variceal bleeding would be prohibitive. In general, we checked the patency of balloons prior to use and found that the tube could be used up to about 10 times. In our series the incidence of gastric balloon rupture after repeated use of the tube was 10%. This is not higher than reported in other studies where in each inflation a new tube was used *(3–5)*. The incidence of chest pain was only 8% in our series compared to Teres *et al. (10)* who reported an incidence of 56.2%. This could be due to, the less frequent inflation of the oesophageal balloon in our series.

One patient who was haemodynamically stable became hypotensive during intubation. This could have been caused by rapid inflation of the balloons but this complication has probably not been reported previously. It is recommended that balloon inflation should be carried out slowly.

Various surgical and non-surgical methods are available for the emergency management of upper gastro intestinal (UGI) bleeding. Emergency surgery for UGI bleeding cannot be performed everywhere and carries a higher morbidity than elective surgery *(10)*. A large number of non-surgical techniques have been employed including sclerotherapy *(11)*, intravenous or intra-arterial vasopressin *(6,7)*, embolization of bleeding vessels *(3)*, cimetidine *(13)* and the

use of tranexamic acid *(14)*. These techniques are sophisticated and need expertise which is not freely available when compared with the Sengstaken–Blakemore tube.

By achieving a high success rate with few complications, the results of the present study argue in favour of the use of the SBT for bleeding oesophageal varices. It remains a simple bedside, low cost and relatively safe non-surgical first line treatment for temporary control of variceal bleeding especially suitable for tropical countries.

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The *Annals* regret to announce the death on 26th November of Sir Hedley Atkins, President of the College from 1966 to 1969. A full Obituary will appear in the March issue and a Memorial Service will be held in the Spring.