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ORIGINAL RESEARCH

# Endoscopic Sclerotherapy for Bleeding Oesophageal Varices: Experience in Gezira State, Sudan

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**Abstract**

**Introduction:** Bleeding due to oesophageal varices is the most common cause of upper gastrointestinal tract haemorrhage in Gezira State, Central Sudan. Endoscopic injection sclerotherapy (EST) is a valuable therapeutic modality for the management of variceal bleeding. Other options for treatment such as variceal band ligation are either expensive or unavailable.

**Objectives:** A retrospective study to evaluate the outcome of (EST) in the management of bleeding oesophageal varices due to portal hypertension in Gezira State, the centre of a developing country, Sudan.

**Methods:** A total of 1073 patients, during 2001–2010, were carefully selected particularly those with bleeding oesophageal varices consequent to portal hypertension. EST was performed using a standard technique and ethanolamine oleate (5%) was utilized as sclerosing agent.

**Results:** There were 777 males (72.4%) and 296 females (27.6%) in a ratio of 2.6. The causes of portal hypertension were found to be schistosomal periportal fibrosis (PPF) in 1001 (93.3%) patients, liver cirrhosis in 60 (5.5%) mixed PPF and cirrhosis in seven (0.7%) and portal vein thrombosis in five (0.5%) patients. Full obliteration of varices required a mean of four sessions with a range of 2–6. In the present study 350 (32.6%) patients have been followed up until complete sclerosis of varices.

**Conclusion:** This study provides evidence that endoscopic injection sclerotherapy is an important component in the management of bleeding oesophageal varices caused by hypertension. It is a safe and effective procedure.

**Keywords:** portal hypertension, sclerotherapy, oesophageal varices, endoscopy

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## Introduction

Schistosomiasis is an endemic disease in 70 countries and affects more than 200 million people world wide.[1] Sudan is endemic with Schistosomiasis, especially in Gezira Irrigation Scheme.[2] The mortality of *Schistosoma mansoni* infection is mostly due to the development of Symmers periportal fibrosis (PPF) and subsequent portal hypertension resulting in oesophageal variceal bleeding with a significant morbidity and mortality.[3,4] More than 50% of those harboring PPF have oesohpageal varices and 3%–4% of them develop haematemesis.[2]

Endoscopy is the cornerstone of the diagnosis and management of bleeding oesophageal varices.[5] Endoscopic injection Sclerotherapy (EST) was described by Crafoordin 1939, but it was then replaced by balloon tamponade and vasopressin.[6] Endoscopic variceal ligation was then introduced which is very effective as compared to sclerotherapy, but it is very expensive.[7] Reports on endoscopic sclerotherapy from Khartoum, the capital of Sudan, were very promising in showing that, the procedure is effective in controlling oesophageal variceal bleeding.[8,9] The majority of patients, living in Gezira, who are affected with schistosomiasis are poor farmers residing in rural areas. It is the first time for endoscopic sclerotherapy to be introduced in a region which is highly endemic with intestinal schistosomiasis.We report here our long–term experience with this procedure.

## Materials and Methods

This study was conducted at Gezira Centre for Endoscopies and Laparoscopic Surgery, located in Wad Medani Teaching Hospital, during 2001 to 2010. A total of 1073 patients who underwent endoscopic injection sclerotherapy were assessed. Inclusion criteria was, bleeding oesohpageal varices due to portal hypertension. Endoscopes (Pentax FG29 W, Olympus GIF E, video endoscope Olympus EVIS lusira) and needle injectors (NM-200L-0421 Olympus) were used in the procedure. Ethanolamine Oleate (5%) (Epico Company, Cairo-Egypt) was the sclerosing agent utilized. Coagulopathy profile including: prothrombin time and platelet counts, as well as liver function test were done a few days before the procedure for each patient. Prolonged prothrombin time as well as ascites, were consequently controlled by vitamin-k and spironolactone, prior to the procedure, in those with Child's-C score. Medazolam (2 mg) and Pethidine (25 mg) were administered intravenously as premedication just prior to sclerotherapy. After an overnight fast the procedure was performed on a day-case basis. Standard technique of sclerotherapy was used with either intravariceal or paravariceal injection of the sclerosing agent.[1] The patients were closely observed for two hours and then discharged. They were advised to start oral feeding two hours after the procedure and to continue on fluid diet for two days, and then to wean themselves onto solids. Scheduling for sclerotherapy sessions was organized every three weeks until the stabilization of the patient's condition was obtained and thereafter on two monthly basis until full obliteration of oesophageal varices was achieved. Follow-up endoscopy was done annually for the selected patients. The author performed all the procedures. Data were analised, tabulated and presented in percentage form.

## Results

A total of 1073 patients were selected for this study, 777 (72.4%) were males and 296 (27.6%) were females. The mean age was 43.12 ± 14.8 (8–95) years. Mean age for patients with schistosomal portal hypertension was 42.2, and mean age for children with portal vein thrombosis was 12.2 ± 2.25 with a range of (8–15) years. Most the patients were farmers 450 (41.9%). 947 (88.3%) patients were from the central region, 67 (6.3%) from a focus in the eastern region, and 59 (5.5%) were patients from other regions of Sudan (Table 1). 419 (39.1%) haematemesis and 20 (1.8%) with melaena 634 (59.1%) patients presented with haematemesis and melaena, (Table 2). Varices size was observed as grade 1 in 17 (1.6%) patients, grade II in 487 (45.4%), grade III in 529 (49.3%) and grade IV in 40 (3.7%) (Table 3). The cause of portal hypertension was schistosomal periportal fibrosis (PPF) in 1001 (93.3%)

**Table 1.** Patients residence.

| Residence | No. of patients (%) |
|---|---|
| Gezira | 892 (83.1) |
| Other regions | 059 (05.5) |
| Sinar | 051 (04.8) |
| Elfao | 049 (04.5) |
| New halfa | 011 (01.0) |
| Elgadarif | 007 (00.7) |
| Eldamazin | 004 (00.4) |
| Total | 1073 (100.0) |

**Table 2.** Types of presentation of variceal bleeding.

| Type | No. of patients (%) |
|---|---|
| Haematemesis | 419 (39.1) |
| Melaena | 020 (01.8) |
| Haematemesis and melaena | 634 (59.1) |
| Total | 1073 (100) |

patients, liver cirrhosis 60 (5.5%), mixed PPF and cirrhosis 7 (0.7%) and portal vein thrombosis in 5 (0.5%) (Table 4). A total of 120 (11.2%) patients presented with haematemesis which recurred after surgery, all of them had splenectomy and vasoligation. Complete sclerosis of oesophageal varices required a mean of four EST sessions with a range of 2–6. A mean of 20 ml of sclerosing agent with a range of 10–30 ml was used per session. The patients who have attended regularly until full obliteration of oesophageal varices were 350 (32.6%).Complications included, oesohpageal stricture 20 (1.9%), fundal varices 10 (0.9%), severe bleeding 3 (0.3%), pleural effusion 2 (0.2%) and peritonitis in 2 (0.2%) (Table 5). Minimal bleeding and chest pain was encountered in a few patients. Mortality was 3 (0.27%) patients, due to severe bleeding.

## Discussion

This study evaluated the outcome of endoscopic injection sclerotherapy (EST) for patients with bleeding oesohpageal varices in Gezira; the centre of a developing country, Sudan. The study was based in Wad Medani Teaching Hospital. Wad Medani is the Capital of the Central State in Sudan with a wide catchment's area serving patients from different states of the country where major highways cross. It is the first time for endoscopic sclerotherapy to be introduced in this region. The procedure was very efficient in the treatment of bleeding oesophageal varices due to portal hypertension.

**Table 3.** Grades of oesophageal varices.

| Grade | No. of patients (%) |
|---|---|
| Grade I | 017 (01.6) |
| Grade II | 487 (45.4) |
| Grade III | 529 (49.3) |
| Grade IV | 040 (03.7) |
| Total | 1073 (100) |

**Table 4.** Causes of portal hypertension.

| Cause | No. of patients (%) |
|---|---|
| Schistosomal periportal fibrosis | 1001 (93.3) |
| Liver cirrhosis | 0060 (05.5) |
| Schistosomiasis with cirrhosis | 0007 (00.7) |
| Portal vein thrombosis | 0005 (00.5) |
| Total | 1073 (100) |

The Gezira Scheme is the largest, artificially irrigated scheme in the country. It is the main source of Schistosoma infection as well as other tropical diseases. The villages are located near canals, where infected water is available for personal and domestic use. In spite of the reasonable improvement in sanitation and safe water supply and praziquantel mass treatment, *Schistosoma mansoni* infection is still very common in the country.[8]

Human Schistosomiasis is a major health problem in many countries including Sudan. The disease is a chronic, debilitating and remains one of the most prevalent parasitic infections in tropical and subtropical environments.[1] Despite control efforts in a number of countries, still 200 millions of people are infected, 10% develop severe disease with symmers fibrosis.[10] Mortality due to *S.mansoni* infection is mainly the consequence of portal hypertension that is caused by hepatic periportal fibrosis (PPF).[11] This fibrosis replaces the whole portal system leading to oesophageal varices, splenomegaly, massive haematemesis and death.[12]

Schistosomiasis was the most common cause of portal hypertension in the study (93.03%) this is unlike the Western countries where liver cirrhosis is the predominant cause.[13] As the liver function test is usually normal in these patients, EST had an excellent outcome.[14] Deterioration in liver reserve is expected following massive haemorrhage with development of ascites and regression of spleen size, but this is usually reversible with blood transfusion

**Table 5.** Complications of sclerotherapy.

| Complication | No. of patients (%) |
|---|---|
| Oesophageal stricture | 20 (1.9) |
| Fundal varices | 10 (0.9) |
| Severe bleeding | 03 (0.3) |
| Pleural effusion | 02 (0.2) |
| Peritonitis | 02 (0.2) |
| Total | 1073 (100) |

and adequate management.[8] Patients who were mainly affected are the young age group (mean age 42.2 years), and males (72.4%), which is consistent with national and international studies.[8,9,17] The high incidence of hepatitis B infection in sub-Saharan Africa and the possible consequence liver cirrhosis in another important cause of bleeding oesaphageal varices in Sudan.[15] In this study 5 (0.5%) patients were children who had portal vein thrombosis as a cause, they needed fewer (2–3) EST sessions. These data are consistent with those of Gasim et al, 2002.[8]

The majority of patients have large varices grade II (45.5%) and grade III (49.3%) which is a recognized predictor of haemorrhage.[8,9] The mean amount of ethanol amine Oleate (5%) required per session was 20 ml with a range of 10–30. Large volumes of sclerosing agents injected per session are preferable to small volumes.[16] Complete sclerosis of oesaphageal varices has needed a mean of four EST sessions. The procedure proved to be effective especially in emergency conditions. Although it was very difficult, in most cases the outcome was good. 350 (32.6%) of our patients were on regular follow up and EST sessions, until full obliteration of oesophageal varices. A possible explanation for patients lost to follow- up is that, bleeding had stopped and so they refrained from further management. Other possibilities were seeking of managements in other centres or death due to the disease itself.

Siqueira et al performed a prospective randomized study in forty patients to compare the efficacy of both sclerotherapy and band ligation in eradicating oesophageal varices as well as the complications. They concluded that both treatments were equally effective in the eradication of oesophageal varices, although banding ligation is better tolerated by the patients and probably faster.[18]

In our study, EST was proved to be effective and relatively safe in the management of bleeding oesophageal varices due to portal hypertension. The fact that the sclerosing agent was imported from Egypt, with periods of shortage in between, has led to a recurrent of bleeding in 108 (10%) of our patients. Another explanation of this rebleeding is that most of our patients are harboring grade II are grade III varices, which is consistent with the national literature. As a result of a reasonably sustained liver function, hepatosplenic schistosomatic patients live longer and better as compared to cirrhotics, and variceal bleeding is their main clinical manifestation[19] Other therapeutic options such as vasopressin, octerotide, endoscopic and transjugular intrahepatic Portal-systemic shunt (TIPSS) are either unavailable or expensive. Surgery if indicated, such as shunt operations or splenectomy and vasoligation could be followed by of bleeding (120 patients (11.2%)) in this study as well as other complications.Splenectomy in this part of the world predisposes the patient to fatal malaria attacks, severe pnemococcal pneumonia and meningitis. It is worth mentioning that, since the introduction of EST, the rate of splenctomies has decreased over three-quarters in our clinical setting. Because of the above facts there is a rationale for EST to be used in Gezira, Central Sudan and other developing countries.

It is however recommended that scheduling for sclerotherapy sessions should be organized every two weeks to help in decreasing the rebleeding rate.

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## Disclosure

This manuscript has been read and approved by the author. This paper is unique and is not under consideration by any other publication and has not been published elsewhere. The author and peer reviewers of this paper report no conflicts of interest. The author confirms that they have permission to reproduce any copyrighted material.

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