



Original Article

Pattern of bacteraemia following endoscopic elective oesophageal injection sclerotherapy and band ligation in cirrhotic patients

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ABSTRACT

Background and study aims: Gastrointestinal endoscopy is an invasive technique and it may be associated with a risk of bacteraemia, especially if endoscopy is associated with an intervention such as injection sclerotherapy or band ligation. The aim of the work is to investigate the incidence of bacteraemia following elective elastic band ligation and elective injection sclerotherapy in cirrhotic patients.

Patients and methods: Our study included 80 cirrhotic patients with grade III–IV oesophageal varices divided into three groups: 30 patients treated with elective injection sclerotherapy, 30 patients treated with elective band ligation and 20 patients underwent diagnostic upper endoscopy and served as control. All patients were subjected to full clinical evaluation, abdominal ultrasonography and lab investigations, including blood culture before and after the endoscopic procedure.

Results: No positive blood cultures were detected before the technique. Seven patients (8.75%) had positive blood culture after endoscopy; six of them (20%) were in the injection sclerotherapy group, one patient (3.33%) in the band ligation group and none in the upper endoscopy group. Positive blood culture was more frequent in Child C patients (four patients) compared to Child B (two patients) and Child A patients (one patient) with statistically significant difference. Three types of micro-organisms were isolated: *Acinetobacter*, alpha haemolytic *streptococci* and coagulase negative *staphylococci*.

Conclusion: The rate of bacteraemia is higher in the injection sclerotherapy group compared with the band ligation group, especially in Child C patients.

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Introduction

Endoscopic procedures, which are commonly employed for diagnosis and treatment purposes in gastroenterology units, can lead to various complications; bacterial infection due to endoscopic procedures may occur [1], depending on factors such as the duration of procedure, contamination of the device, inappropriate disinfection and insufficient mechanical cleaning of the devices [2]. This is in addition to host factors that may predispose to bacteraemia, for example, defective immunological response as in liver cell failure, renal failure, diabetes, elderly patients with malignant diseases and immuno-compromised patients as, transplant recipients and patients on immunosuppressive drugs [3,4].

The most commonly seen systemic complication of endoscopic examination is fever, which results from inflammation not related to infection. However, there are rare reports of serious complications such as brain abscesses, perinephric abscesses, bacterial peritonitis and endocarditis [5].

The incidence of bacterial infection in hospitalised cirrhotic patients is higher than other patients, ranging from 33% to 61%. The most frequent infections are urinary tract infection (12%), spontaneous bacterial peritonitis (23%), respiratory infection (6%) and bacteraemia (4%). Bacterial infections account for up to 38% of deaths in patients with chronic liver disease, both directly and indirectly [6]. The frequent occurrence of bacterial infections in cirrhotic patients probably results from deficient defence mechanisms such as complement deficiency, alterations in immunoglobulin levels, defects in opsonisation activity as well as in serum bactericide activity, a decrease in the phagocytic activity of the reticuloendothelial system and neutrophilic dysfunction [6].

Transitory bacteraemia is a frequent event and may even occur following a minor trauma. Most bacteraemias do not cause symptoms and have no clinical significance. However, they become important in immunodeficient patients and in those at risk for the development of infective endocarditis [6].

In view of the existing immunological deficit in patients with cirrhosis and the existing bypass of the reticuloendothelial system resulting from the collateral circulation of the portal system, common in cirrhotic patients, a transitory bacteraemia can become permanent. This may favour seeding of bacteria in distant sites and

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the development of infection [7]. Therefore, antibiotic prophylaxis before upper endoscopy has been established for cirrhotic patients with acute bleeding [8,9,2].

In the Gastrointestinal Endoscopy Unit of Cairo University, elective injection sclerotherapy is still taking the upper hand over band ligation in the management of oesophageal varices due to limited resources precluding the uninterrupted availability of ligation sets. In the year 2009, 1224 patients were submitted to elective endotherapy of oesophageal varices; of these, 911 patients (74.4%) were treated by injection sclerotherapy, while 313 patients (25.6%) were treated by band ligation.

This study aimed at investigating the pattern of bacteraemia following elective band ligation and elective injection sclerotherapy in cirrhotic patients.

Patients and methods

This prospective study was carried out in the period from September 2008 to June 2009. Eighty adult cirrhotic patients were included. They were admitted in the Endemic Medicine Department and they were referred for oesophago-gastroduodenoscopy in the Gastrointestinal Endoscopy unit, Faculty of Medicine, Cairo University. Only patients with oesophageal varices grade III and IV, according to Thakeb et al. [10] were included. They were classified into three groups as follows:

- Band ligation group of 30 patients submitted to elective band ligation for either primary or secondary prophylaxis.
- Injection sclerotherapy group of 30 patients submitted to elective injection sclerotherapy for secondary prevention of variceal bleeding.
- Upper endoscopy group of 20 patients submitted to diagnostic upper endoscopy (control group).

Exclusion criteria were as following:

- Patients who had clinical and/or laboratory evidence of current infection.
- Patients who received antibiotics in the last 7 days.
- Diabetic patients.
- Patients with renal impairment.

Informed consent was obtained from the patients before they were included in the study, which had been approved by the Ethics Committee of our institution.

All patients were subjected to history taking, clinical examination, laboratory investigations in the form of urinalysis, complete blood count, erythrocyte sedimentation rate, liver profile, namely assay of serum bilirubin (total and direct), transaminases, alkaline phosphatase, serum albumin and prothrombin time and concentration. Child score was calculated for every patient according to the Child–Pugh classification [11]. Abdominal ultrasonography was done, using a Toshiba SSA340® (Toshiba, Japan) machine with

a 3.5-MHz curved sector transducer. Upper endoscopy was performed in all patients using the endoscopic device Olympus XQ 20® (Olympus, USA). Number and grade of oesophageal varices, presence of gastric or fundal varices and signs of gastritis, portal hypertensive gastropathy and duodenitis were reported.

Thirty patients (endoscopic sclerotherapy group) were subjected to elective injection sclerotherapy for follow-up after primary control. The sclerosant material used was ethanolamine oleate 5% (EPICO, Egypt). Injection was done with 3–5 ml for each varix. A total of 5–30 cc was used in every session. The patients were injected intra- and/or paravariceally using a disposable sterile 8–20 mm sclerotherapy needle (Wilson-Cook, USA).

Thirty patients (band ligation group) were subjected to elective band ligation following diagnostic upper endoscopic examination, for either primary or secondary prophylaxis. Elective endoscopic band ligation was done by using the Wilson-Cook multi-band ligator. Ligation was initiated at or just above the oesophago-gastric junction. One band was applied per variceal column unless the column was very large; in this case, another band was applied.

Technique of blood culture. Blood cultures were withdrawn for all patients 5 min before and 30 min after the endoscopic procedure. Blood samples were collected with complete asepsis and incubated for 7 days and observed for growth of aerobic and anaerobic organisms on tryptic soya broth media (Oxoid®). The blood culture samples were processed and the positive samples were identified.

Infection control. Cleaning and disinfection was done according to OMED/WGO guidelines [12].

Follow-up of the patients. Patients were checked for the presence of fever or any symptom or sign of infection within 7 days after endoscopy.

Statistical methods. Data were analysed by Microsoft Office 2003 (Excel) and Statistical Package for Social Science (SPSS) version 10. Results were expressed as means and standard deviation (SD) of the means. Differences between groups were analysed by using either the chi square test or Student's *t*-test and non-parametric (Mann–Whitney test) for comparison between two groups or the analysis of variance (ANOVA) test for multiple group comparison. The *p* value was considered significant at $p \leq 0.05$.

Results

Our study included 80 adult patients with an age range of 32–66 years with a mean of 49 years and SD of 28.8. There were 46 (57.5%) males and 34 (42.5%) females, with no significant difference between the age and gender in different groups. Thirty-nine (48.75%) patients were of Child A class, 25 patients (31.25%) were of Child B class and 16 (20%) were of Child C class with no statistically significant difference between the different groups (Table 1).

Forty-four (55%) patients had grade III varices and 36 (45%) had grade IV varices, with no significant statistical difference between the different groups. A total of 39 (48.75%) patients had reflux oesophagitis and 25 (31.25%) had gastric and/or duodenal ulcers (Table 2).

Table 1
General characteristics of the studied groups.

	Upper endoscopy group (20)	Injection sclerotherapy group (30)	Band ligation group (30)	<i>p</i> value
Age in years [Mean (SD)]	42.15 (13.69)	46.13 (9.06)	47.1 (6.78)	NS
Males [<i>N</i> (%)]	10 (50%)	18 (60%)	18 (60.0%)	NS
Females [<i>N</i> (%)]	10 (50%)	12 (40%)	12 (40.0%)	NS
Child A	12 (60%)	14 (46.67%)	13 (43.33%)	NS
Child B	4 (20%)	10 (33.33%)	11 (36.67%)	NS
Child C	4 (20%)	6 (20%)	6 (20%)	NS

NS = non-significant ($p > 0.05$).

N = number.

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