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Bacteremia in Gastrointestinal Endoscopy

ALY GABBALLA, M.D.; HANAA EL-DEGUY, M.D.;
NADIA EL-FEKY, M.D. and MOHAMED N. ZOHEIR, M.D.

The Internal Medicine and Clinical Pathology Departments,
Faculty of Medicine, Cairo University.

Abstract

This study was carried out on 25 patients who underwent endoscopic examination. Upper gastrointestinal (GIT) endoscopy was done for 7 patients, endoscopic variceal sclerotherapy (EVS) for 6 patients, endoscopic retrograde cholangiopancreatography (ERCP) for 6 patients and colonoscopy for 6 patients. All patients had no clinical evidence of infection or septic foci. Blood samples were taken from every patient immediately before and 5 minutes after each procedure, and the blood was cultured for aerobic and anerobic organisms. Two patients had positive pre endoscopic blood culture. The organisms were staphylococcus negative coagulase, one of the patients had staphylococcus negative coagulase as well in the postendoscopic culture, so it is considered as a contaminant. The other patient developed positive post-endoscopic blood culture for Escherichia coli (E.Coli), So bacteremia developed in only one case out of the twenty five patients with an incidence of 4%.

Introduction

ADVANCES in fiberoptic endoscopy have greatly aided gastroenterologists in the diagnosis and treatment of digestive problems. It should be a safe procedure, but there are potential hazards including medication reactions, pulmonary problems, perforation, instrument impaction, bleeding, cardiac arrhythmias and transmission of infection[**1**].

Many studies reported no bacteremia during simple upper endoscopy[**2,3**], but others[**4**] found an incidence reaching 10% with isolation of a wide variety of microorganisms. Low incidence of bacteremia following EVS has been reported [**5,6,7**] but Cohen et al. in 1983[**8**] found an overall rate of bacteremia of 50% after EVS. Very low incidence of bacteremia has been also reported following ERCP [**9,10,11**], but Sauter & coworkers in 1990 [**12**] reported 16% incidence in patients undergoing this procedure. Many authors reported that bacteremia is not a complication of colonoscopy[**13&14**] and Vellacott in 1984[**15**] reported bacteremia in only one patient out of 100 undergoing flexible sigmoidoscopy.

The aim of this work is to study the incidence, causative organisms and hazards of bacteremia following upper GIT endoscopy, EVS, ERCP & colonoscopy.

Material and Methods

This study comprised 25 patients referred to the Internal Medicine department at Kasr El Eini hospital. They were 17 males and 8 females. Their ages ranged from 14-75. No patient was febrile or had intravenous or urinary catheter. None had received antibiotic or immunosuppressive therapy for at least 72 hours prior to the procedure. They all had no clinical evidence of infection or septic foci.

All patients were subjected to clinical examination, urine and stool analysis, full blood picture, liver function tests (not included) and abdominal ultrasonography.

The following endoscopic procedures were done :

1. Oesophago-gastro duodenoscopy. This was done for 7 patients using forward viewing flexible fiberoptic endoscope Olympus GIF1 and Olympus GIF GW. Examination was carried out down to the second part of the duodenum Biopsies were taken from one case.

2. Endoscopic variceal sclerotherapy (EVS) was done for 6 patients using flexible fiberoptic Olympus GIFL T10. The sclerosant used was ethanolamine oleate. The total amount of sclerosant did not exceed 20 ml per session and the injection technique was exclusively intravariceal.

3. Endoscopic retrograde cholangiopancreatography ERCP, was done for 6 patients using the Olympus flexible fiberophic duodenoscope (type JF1, T) with side viewing optics. The contrast material was urograffin 15 ml. Sphincterotomy & stone extraction was done in one case.

4. Colonoscopy was done for 6 patients using flexible fiberoptic olympus CFIBW & the colon was examined up to the cecum. Biospsies were taker from 4 cases.

Endoscopes were disinfected by activated glutaraldehyde solution (Ido scope) 2%.

Bacteriological examination was done for aerobic and anaerobic culture. Blood samples were obtained immediately before and 5 minutes after the endoscopy. The skin was cleaned with betadine using 3 scrabs and washed with 17% alcohol. After this 10 ml of blood were withdrawn from a convenient vein.

Results

The 25 patients were divided into 4 groups :

Group 1 : Included 6 patients who underwent upper GIT endoscopy. Endoscopy & blood culture are listed in table 1 & 2.

Group 2 : Included 6 patients who underwent EVS they all had liver cirrhosis, portal hypertension and bleeding esophageal varices. Results of EVS & are listed in table (3).

Group 3 : Included 6 patients who underwent ERCP. Their ERCP findings are shown in table (4).

Table (1) : The Results of Upper Gastrointestinal Endoscopy Examination in Patients of Group 1.

Patient's Number	Upper gastrointestinal endoscopy findings
1	Grade 3 oesophageal varices.
2	Post sclerotherapy scars of oesophageal varices.
3	Small sessile polyp (0.5 cm) in duodenal bulb. Biopsies were taken from it.
4	Oesophageal varices grade 2. Fundal and antral gastritis. Incompetent Cardia.
5	Multiple superficial gastric and duodenal ulcers.
6	Slight gastroduodenitis.
7	Grade 2 oesophageal varices.

Table (2) : The Results of Bacteriological Examination of Blood Cultures of Patients in Group 1.

Patient's Number	Pre-endoscopic blood culture	Post-endoscopic blood culture
1	Negative	Negative
2	Positive The organism was Staphylococcus -ve coagulase	Positive The organism was Staphylococcus -ve coagulase
3	Positive The organism was Staphylococcus -ve coagulase	Positive The organism was Escherichia coli.
4	Negative	Negative
5	Negative	Negative
6	Negative	Negative
7	Negative	Negative

Table (3) : The Results of Endoscopic Variceal Sclerotherapy in Patients Group 2.

Patient's Number	Grade of varices	Number of sessions of sclerotherapy	Amount of ethanolamine oleate used
1	Grade 2 esophageal varices	4 sessions	10 ml.
2	Grade 2 esophageal varices	4 sessions	12 ml.
3	Grade 3 esophageal varices	5 sessions	12 ml.
4	Grade 2 esophageal varices and multiple gastric varices	3 sessions	9 ml.
5	Grade 2 esophageal varices	2 sessions	10 ml.
6	Grade 3 esophageal varices and multiple fundal varices	4 sessions	18 ml.

Table (4) : The Results of ERCP Examination in Patients of Group 3.

Patient's Number	ERCP findings
1	Dilatation of common bile duct
2	Stricture in lower end of common bile duct
3	Sphincterotomy and stone extraction from common bile duct
4	Invasion of tumour of head of pancreas to choledochoduodenal part
5	Stricture of lower end of common bile duct and slight dilatation above it, Stent was passed
6	Dilated common bile duct that filled with small stones. Stent was passed

Table (5) : Results of Colonoscopic Examination in Patients of Group 4.

Patient's Number	Colonoscopy findings
1	Free (but few living oxyuris worms in colon were found)
2	Multiple hyperaemic patches in sigmoid colon with few ulcers Biopsies were taken
3	Five areas in transverse colon and caecum covered by necrotic greyish membranes and profusley oozing blood Biopsies were taken
4	Patchy hyperaemic areas up to mid-transverse colon Biopsies were taken
	Free
6	Scattered haemorrhagic patches in the desceding and tranvsverse colon Extensive ulcerations in terminal ileum Biopsies were taken from colonic and ileal lesions

Group 4 : Included 6 patients who underwent colonoscopy. Their colonoscopic examinations are shown in table (5). Abdominal ultrasonographic findings for group 1, 2 & 3 are shown in table (6).

Discussion

Bacteremia may be an important complication of the GIT endoscopy. Previous studies on bacteremia with simple upper GIT endoscopy reported an incidence that varied from 0-10% with isolation of a wide variety of microorganisms including, alphahemolylic and non hemolytic streptococci, staphylococci, Neisseria, and Diphteroid species, lactobacilli and on occasion Enterococci[**16,4**]. In our work all cultures were negative except in two patients whose blood showed staphylococcus negative coagulase before the upper GIT endoscopy. The same organism was found in the postendoscopy blood culture in one of these two patients (table 2). However, the presence of staphylococcus negative coagulase in the blood culture before and after the procedure should be considered as a contaminant because these organisms are normal skin inhabitants. This was previously clarified by Shull et al[**16**]. The other patient showed E.Coli in the post procedure blood culture. He had chronic myeloid leukemia and diabetes mellitus. His endoscopic examination showed small sessile duodenal polypi from which multiple biopsies were taken (table 1). Biopsy sampling may have increased the risk of bacteremia, however Shorvon and coworkers[**3**], reported that the biopsy sampling didn't increase this risk and this seems plausible to us because biospy taken from other patients included in our study

Table (6) : The Results of Abdominal Ultrasonography in Patients of Group 1,2,3.

Group 1 Pt Nb	Liver	Portal vein	Spleen	Ascites	Gall bladder
1	Shrunken-cirrhotic	Dilated (21 mm)	Splenomagaly	Present	Normal
2	Mild hepatomegaly-cirrhosis	Dilated (15 mm)	Splenomagaly	Present	Multiple stones
3	Mild hepatomegaly	Normal	Marked splenomegaly	Absent	Normal
4	Moderate hepatomegaly-cirrhosis	Dilated (20 mm)	Splenomagaly	Minimal	Normal
5	Normal	Normal	Normal	Absent	Normal
6	Normal	Normal	Normal	Absent	Normal
7	Shrunken-cirrhotic	Dilated (23 mm)	Splenomagaly	Marked	Normal
Group 2					
1	Shrunken-cirrhotic	Dilated (19 mm)	Enlarged	Present	Normal
2	Shrunken-cirrhotic	Dilated (16 mm)	Enlarged	Absent	Normal

Table (6) Cont

3	Shrunken-cirrhotic		Dilated (18 mm)	Enlarged	Present	Normal
4	Shrunken-cirrhotic		Dilated (23 mm)	Enlarged	Present	Normal
5	Moderateyenlarged-Marked		Dilated (18 mm)	Enlarged	Absent	Normal
6	Enlarged-cirrohtic pattern		Dilated (19 mm)	Enlarged	Absent	Normal
Group 3						
1	Enlarged (fatty)	Dilated	Normal	Normal	Absent	Normal
2	Enlarged	Dilated	Normal	Normal	Present	Normal
3	Mildly enlarged	Dilated small calculi	Mildly dilated (15 mm)	Mildly enlarged	Absent	Contracted with multiple stones
4	Enlarged Mildly	Dilated intrahepatic portion	Mildly dilated (15 mm)	Mildly enlarged	Absent	Normal
5	Enlarged	Dilated	Normal	Normal	Absent	Markedly dilated
6	Enlarged	Dilated	Normal	Normal	Absent	Normal

was not associated with positive post-procedure culture. Bacteremia may have developed in this patient because he was seriously compromised. In fact two cases of fatal sepsis due to pseundomonas Aeruginosa developed with acute leukemia after flexible esophogoscopy and biopsy and were reported by Green et al[**17**].

Blood cultures following EVS, ERCP and colonoscopy were all negative in our present study. In fact, low incidence of bacteremia after EVS has been reported by Camara et al in 1983[**5**] and Low et al in 1986[**7**] the latter added that the type of organism isolated suggested the skin rather than the blood as the source of bacteria. Our results also agreed with those of Brayko & coworkers[**6**] who reported no bacteremia in 11 consecutive patients undergoing a total of 34 EVS sessions. On the other hand the high rate of bacteremia reported by Cohen et al[**8**] could be explained on the basis of their EVS method. Each patient received 30 separate injections which consisted of 10 injections of thrombin followed by 20 injections of 5% sodium morrhuate. The frequent break of the mucosal barrier in this procedure may well account for the high incidence of bactermia[**7**]. We can thus conclude that EVS is a safe procedure, the incidence of bacteremia doesn't increase with the number of previous EVS the patients had undergone or with the proximity of EVS to the variceal bleeding episode. We also agree with Shuman[**18**] that the amount of fibrosis of the esophageal wall is not related to the occurrence of EVS associated bacteremia. However, complete aseptic techniques are mandatory since EVS disrupts the vascular defense barrier and a foreign material is directly injected into the blood stream.

ERCP has been reported to be associated with low incidence of bacteremia [**9,11**] Low et al[**10**] reported, in agreement with our results, no bacteremia following ERCP, on the other hand the relatively high rate of bacteremia 16% reported by Sauter & Coworkers[**12**] can be explained by the large volume of blood samples taken for culture (20 ml) and by being done during the procedure. We agree with other previous works[**9,12**] in that the type of instruments and the care in its passage play a major role in the decreased incidence of bacteremia as the duodenoscope used for ERCP is smaller in diameter than the diagnostic upper endoscope & has a smooth rounded tip because of its lateral viewing configuration, so it is easier to pass than the conventional forward viewing instrument and thus is less traumatic. Our results also confirm the fact that sphincterotomy & stone extraction when done to our patients didn't enhance the frequency of bacteremia.

Bacteremia is not a complication of colonoscopy as previously reported[**13,14**] in agreement with our results. In fact bacteremia was reported by Vellacott[**15**] in one patient (with inflammatory bowel disease) out of 100 patients undergoing colonoscopy. So he suggested that septicemia of large bowel endoscopy should raise the clinician's suspicion of inflammatory lesions rather than accepting it as a normal risk of endoscopy. We can also conclude, in agreement with a previous work[**3**] that break of the mucous mem-

brane by the colonic biopsies taken from the patients didn't increase the risk of bacteremia.

Upper GIT endoscopy is a safe procedure and is not accompanied by bacteremia except in the immuno-compromised cases. The use of prophylactic antibiotics is recommended, before and after the procedure in all immuno-suppressed patients.

EVS, ERCP and colonoscopy are also safe provided there is care in the passage of the instrument and provided complete aseptic techniques are undertaken.

Sphincterotomy and stone extraction during ERCP didn't increase the risk of bacteremia and biopsy taking didn't increase that risk after colonoscopy.

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