A prospective evaluation of the incidence of bacteremia associated with EUS-guided fine-needle aspiration

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Background: Endoscopic ultrasound (EUS)–guided fine-needle aspiration (FNA) is frequently performed for diagnostic evaluation of lesions in or near the gastrointestinal (GI) tract. Little data exist concerning possible infectious complications associated with EUS-guided FNA. This prospective evaluation was undertaken to determine the frequency of bacteremia and infectious complications associated with EUS-guided FNA.

Methods: All patients undergoing EUS-guided FNA for any indication were enrolled in this study. Patients who required antibiotic prophylaxis as per the American Heart Association or American Society for Gastrointestinal Endoscopy guidelines were excluded from the study as were patients with cystic lesions, patients with advanced liver disease/ascites and those with human immunodeficiency virus/acquired immune deficiency syndrome. Blood cultures were obtained 30 and 60 minutes after the EUS-FNA. Patients were monitored for evidence of infection after procedure including telephone follow-up of each subject 1 week after procedure.

Results: One hundred patients underwent EUS-FNA of 108 lesions. All blood cultures were negative except in 6 patients in whom 1 of 2 bottles were positive for coagulase negative Staphylococcus, which was considered a contaminant. There were no complications of acute febrile illness, abscess or other infections.

Conclusion: EUS-guided FNA was not associated with bacteremia or infectious complications.

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N.J.). A follow-up phone call from an endoscopy nurse not involved in the study was made to all patients 1 week after the procedure. Subjects were questioned about the occurrence of fever, chills or urgent visits to their physician or the emergency department for any infectious complication (e.g., fever, phlegmon or abscess formation).

Microbiologic techniques

Before EUS, all patients underwent placement of 2 separate 20-gauge angiocatheters each in a different arm by using aseptic techniques. One intravenous line was used for intravenous administration of sedative medications and the second was used to collect blood cultures. It has been shown that blood cultures drawn from intravenous lines are equivalent to those obtained from peripheral venipuncture. Preparation of the intravenous wound site consisted of a 1-minute application of 10% povidone-iodine solution. The angiocatheter was flushed with sterile nonbacteriostatic 0.9% sodium chloride and swabbed with 10% povidone-iodine solution between blood draws. Ten milliliters of blood was withdrawn at 30 and 60 minutes after the last EUS-FNA and were injected into commercially available aerobic/anaerobic blood culture bottles (Difco ESP 80AN; Difco Labs, Detroit, Mich.). The blood cultures were incubated at 35°C for 7 days. They were reported as negative if no growth occurred with the aerobic/anaerobic blood culture bottles or on blind subculture every 24 hours and 7 days.

EUS techniques

EUS-guided FNA was first performed by using the radial scanning echoendoscope (EU-M130 or EU-M20; Olympus America, Inc., Melville, N.Y.) in the usual manner. After confirming the diagnosis and defining the local anatomy, the radial scanning instrument was withdrawn and a linear array instrument (FG32UA or FG36UX; Pentax Instrument Corp., Orangeburg, N.Y.) was introduced for the performance of EUS-guided FNA. Two different types of 22-gauge needles (GIP; Mediglobe, Tempe, Ariz., or EchoTip; Wilson-Cook Medical, Winston-Salem, N.C.) were used depending on the endosonographer’s preference and the quality of the retrieved cytology sample. The EUS-guided FNA technique has been previously described in detail.

RESULTS

A total of 108 sites were aspirated in 100 patients, with 56% of subjects having a pancreatic mass, 17% mediastinal lymphadenopathy, 16% gastric or esophageal mass, 5% ampullary lesions and 6% miscellaneous lesions. In 8 patients more than 1 site was aspirated by using EUS-guided FNA. A total of 377 EUS-guided FNA passes were performed (mean 3.4 per site). Table 1 summarizes the indication or site, number of lesions aspirated at each site and the mean number of passes per site for EUS-guided FNA for the study group. All subjects were successfully contacted by phone 1 week after procedure. There were no complications noted in the study group. There were a total of 200 sets of blood cultures drawn. In these incubated blood cultures there was no significant bacterial growth except in 6 patients in whom coagulase negative Staphylococcus grew in 1 of 2 bottles. These 6 positive blood cultures were considered to be due to contaminants. All patients, including the 6 patients with contaminated positive blood cultures, remained asymptomatic without fever (defined as an oral temperature of 38°C) or chills during the observation period in the endoscopy unit. There was no infectious complication (e.g., fever, phlegmon or abscess formation) reported by any subjects or the referring physicians at 1 week after the EUS-guided FNA.

Table 1. The indication/site, number of lesions and the average number of passes per site

<table>
<thead>
<tr>
<th>Site</th>
<th>No. of lesions</th>
<th>Mean no. of passes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periampullary mass</td>
<td>5</td>
<td>2.6</td>
</tr>
<tr>
<td>Esophageal thickening/mass</td>
<td>14</td>
<td>2.8</td>
</tr>
<tr>
<td>Gastric mass</td>
<td>3</td>
<td>2.3</td>
</tr>
<tr>
<td>Left adrenal mass</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Liver mass</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Mediastinal mass/lymph node</td>
<td>18</td>
<td>3.7</td>
</tr>
<tr>
<td>Pancreatic mass</td>
<td>61</td>
<td>3.6</td>
</tr>
<tr>
<td>Peripancreatic mass/lymph node</td>
<td>3</td>
<td>2.3</td>
</tr>
</tbody>
</table>

DISCUSSION

Most of the published data on bacteremia after GI instrumentation focuses on bacteremia after endoscopic procedures. Botoman et al. summarized the published information and found that for most endoscopic procedures, the incidence of bacteremia is low (approximately 2% to 6%) and due to organisms unlikely to cause infectious endocarditis. Zuccaro et al. surveyed 285 active ASGE members as to their use of antibiotics prophylactically in various clinical scenarios. It was evident from this study that the ASGE and AHA guidelines for the use of antibiotics prophylactically are selectively observed and that pressure from patients and referring physicians can influence their use in this manner.

EUS and EUS-guided FNA are generally acknowledged to be safe and well-tolerated endoscopic procedures. EUS-guided FNA involves the insertion of a 22-gauge needle through the bowel wall into the target lesion. The associated disruption of mucosal integrity is likely (at least in theory) to produce a portal of entry for microorganisms that eventually can be recovered from the blood. Repeated FNA may forcibly inoculate bacteria through the mucosal defect resulting in a transient bacteremia. In our prospective study all blood cul-
tasures, excluding skin contaminants, after endoscopy were negative. The incidence of bacteremia in our study was 0% and there were no infectious complications noted. Van de Mierop et al. reported in abstract form on the incidence of bacteremia after EUS-guided FNA. Interestingly, the frequency of bacteremia in this small prospective study of 15 patients was 19% after excluding contaminants. Furthermore, the positive blood cultures were among those samples taken 5 minutes after EUS; the method of obtaining these cultures was unclear. It is also not clear in the preliminary report of their study whether endoscopic dilation was performed, which is an independent risk for bacteremia. Other factors such as duration of procedure or the performance of an endoscopic biopsy or polypectomy have not been associated with a high rate of bacteremia.

Patients who underwent EUS-guided FNA of cystic lesions in the chest or abdomen were excluded from this study. EUS-guided FNA of these lesions has a significant risk of febrile complications. It is our practice to give an antibiotic intravenously before or during FNA of a cystic lesion and to continue with oral antibiotic administration for 5 to 10 days. A single FNA is usually performed on these lesions with attempts to aspirate until they collapse, if possible. It is noteworthy that in clinical practice the bulk of EUS-guided fine-needle aspirates are pancreatic and mediastinal; this was also the case in our study and has been noted in other studies.

In a previous study on EUS-guided celiac plexus block, our postulate was that acid suppression therapy might lead to bacterial colonization of the stomach, which might then increase the risk of infectious complications after EUS-guided celiac plexus block. In our current study, however, 24% of patients were receiving acid suppression therapy, but this was not found to be an independent risk factor for bacteremia.

Several studies evaluating the incidence of bacteremia after GI procedures have demonstrated that bacteremia usually occurs within 30 minutes of the end of the procedure. In our study blood cultures were obtained at 30 and 60 minutes after procedure. Theoretically, some transient episodes of bacteremia occurring immediately after the procedure could have been missed. Transient bacteremia, however, may occur after normal activities such as tooth-brushing or bowel movement, digital rectal examination and barium enema. However, the risk of infectious endocarditis should not be based on the relative frequency of transient bacteremia.

In conclusion, our data suggest that EUS-guided FNA does not induce bacteremia. Although highly unlikely, a low rate of bacteremia could possibly have been missed in our study. A study that includes a large number of patients would be needed to demonstrate this. Such a large prospective study would be impractical and costly to perform. Routine administration of antibiotics prophylactically before EUS-guided FNA (other than those delineated by ASGE and AHA guidelines, i.e., endocarditis) is probably not indicated except for EUS-guided FNA of cystic lesions or lesions in the lower GI tract.

REFERENCES