Fatal ventricular arrhythmia as a complication of transesophageal echocardiography

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Abstract Aim To report a case of serious ventricular arrhythmia during transesophageal echocardiography. Methods and results: A 58-year-old woman with previous mitral and tricuspid valve replacement and permanent pacemaker implantation suffered from recurrent fever and Staphylococcus aureus bacteremia. Transesophageal echocardiography was performed as part of the assessment for infective endocarditis. During this procedure the patient developed sustained ventricular tachycardia and subsequently ventricular flutter. She was successfully resuscitated. Subsequently the procedure was undertaken under general anesthesia with no complications. Conclusion: The increasing use of TEE in a wider spectrum of patients, many of whom are seriously ill, may result in serious side-effects.

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Introduction

Transesophageal echocardiography (TEE) is a common diagnostic tool, with only occasional reports of complications. We describe a case of a serious ventricular arrhythmia during TEE.

Case report

A 58-year-old woman was admitted with a 2-week history of weakness and fever. She had undergone a biological mitral valve replacement (MVR) 16 years previously for mitral stenosis. Three years ago she underwent a prosthetic MVR due to a degenerative xenograft and tricuspid prosthetic valve replacement due to severe tricuspid insufficiency and pulmonary hypertension. In addition a permanent pacemaker was implanted due to complete AV block.
On physical examination the temperature was 38 °C, the blood pressure was 105/70 mmHg, pulse 70 beats per minute and O₂ saturation was 94%, breathing room air. There were no signs of endocarditis. The electrocardiogram and chest X-ray were unremarkable and specifically the QTc was within normal limits. Laboratory testing revealed an ESR elevated to 140 mm/h, a normochromic normocytic anemia of 10 g/dl. The serum electrolytes and creatine kinase were within normal limits. Intravenous ceftriaxone 2 g od was started. Subsequently methicillin-sensitive Staph aureus grew from 3 separate blood cultures and the treatment was changed to cloxacillin, rifampicin and gentamicin iv.

TEE was performed to examine for the presence of vegetations. She was given xilocaine oral spray for local anesthesia and 2 mg of midazolam intravenously as a slow injection over 2 min before the procedure. Prior to the procedure her blood pressure was 140/80 mmHg, the pulse was 88 per minute, and the oxygen saturation was 96% breathing room air. Following the administration of midazolam, the blood pressure was 130/70 mmHg, the pulse increased to 102 per minute and the saturation remained at 96%. Probe insertion was achieved easily on the first attempt. Four minutes after the TEE probe was inserted, the patient developed loss of consciousness, seizures and ventricular tachycardia, deteriorating to ventricular flutter appeared on the TEE monitor (Fig. 1). The patient was successfully resuscitated.

Two days later the patient underwent a further TEE under general anesthesia with prophylactic intubation, without complications. The TEE revealed mild global LV dysfunction, normal mitral and tricuspid prosthetic valve function with no vegetations visible on the valves or the pacemaker leads. Subsequently there was a complete recovery.

Discussion

There are few reports of complications following TEE, including methemoglobinemia related to the oral benzocaine spray, a Mallory-Weiss tear of the esophagus following intraoperative TEE and perforation of the thoracic esophagus (all reviewed in Ref. 1). Reports of associated arrhythmias are rare. A case series of 7200 adult cardiac surgical patients who underwent intraoperative TEE did not reveal any arrhythmias.2 In a series of 341 obese patients and 323 control patients undergoing TEE, there was 1 case of atrial fibrillation in the obese group and 1 case of SVT in the control group associated with the procedure.3 Another study of 10,419 patients, of whom 88.7% were conscious, and the vast majority without sedation, found 3 cases of non-sustained VT, 3 cases of transient atrial fibrillation and 1 case of 3rd degree AV block.4

There is much more experience regarding cardiovascular complications of upper GI endoscopy. Of 21,946 endoscopic procedures performed over a 4-year period, there were 4 cases of SVT, 2 cases of myocardial infarction and 1 case of CHF.5 Furthermore, 25 patients with coronary heart disease who underwent upper GI endoscopy with conscious sedation and ambulatory electrocardiographic monitoring had no increased evidence of arrhythmias or ischemia during endoscopy.6

The increase in the use of TEE has led to a larger number of increasingly ill patients undergoing the procedure. Our patient had criteria of SIRS (systemic inflammatory response syndrome), and in addition mild global LV dysfunction. Patients with cardiomyopathy have a decreased threshold for arrhythmias. It is possible that the release of adrenergic hormones together with hypoxia from the sedation during the procedure acts as a trigger for these arrhythmias.

There have been no previous reports of near fatal arrhythmias following TEE. This may reflect negative publication bias, but it is clear that this complication is exceedingly rare. Our patient subsequently underwent TEE under general anesthesia a couple of days later, with no complications. We suggest that for severely ill patients performance of the examination under general anesthesia may be appropriate.

Figure 1 Four-chamber view on TEE showing the prosthetic mitral valve and prominent spontaneous contrast in left atrium. Ventricular flutter is seen on the electrocardiogram several minutes after the procedure was started.
References


