A 62-year-old female patient with highly symptomatic, idiopathic, monomorphic, premature ventricular contraction presented at our institution for further treatment (Figure 1A). Previous medical antiarrhythmic treatment has failed. She had a history of mitral valve repair attributable to rheumatic heart disease 2 years before and paroxysmal atrial fibrillation. Aside from that, transthoracic echocardiogram revealed no structural heart disease. Indication was set for catheter ablation. After transseptal puncture (BRK-0 transseptal needle, St. Jude Medical, St. Paul, MN) a left ventricular electroanatomic activation map of the premature ventricular contraction was done using the CARTO-3 RMT system (Biosense-Webster, Diamond Bar, CA). The site of earliest activation was found in an inferoseptal apical position (Figure 1B and 1C). During radiofrequency ablation at this site with a 3.5-F external irrigated tip catheter (Navistar Thermcoool, Biosense-Webster) with 50 W and max temperature of 46°C suddenly a loud steam pop occurred, together with an impedance drop of 34 Ω. However, blood pressure stayed stable for the rest of the procedure and pericardial effusion was ruled out immediately after steam pop, after the procedure, and the next day. The clinical premature ventricular contraction could successfully be terminated during ablation at the apical third of the left ventricular septum by a total of 54 radiofrequency ablation lesions.

Two weeks later she presented again with progressive dyspnoea. An echocardiogram revealed a ventricular septal defect with distinctive left to right shunt (Figure 2, Movie I in the online-only Data Supplement). In ventriculogram shunt was quantified as 1.9/1 (Qp/Qs) (Figure 3, Movie II in the online-only Data Supplement) and indication was set for surgical repair. During on-pump cardiac surgery by median sternotomy a 1.5×3 cm inferoapical ventricular septal defect was closed by insertion of a 7×5 cm xenologic pericardial patch (Figure 4). Additionally, tricuspid valve was reconstructed by the use of a 30-mm Cosgrove-band (Edwards Lifesciences Corp, Irvine, CA). Five days after surgery the patient could be transferred from intensive care unit to ward. Further hospital stay was uneventful, and she was discharged on ninth postoperative day.

It is commonly perceived that the risk of cardiac perforation during ablation in the ventricle is relatively small compared with atrial ablation. The risk of perforation during ablation of atrial fibrillation is about 2.5%." On the other hand, the risk of ventricular perforation during ablation is ranging from 0.4% to 1.0%.

To the best of our knowledge this is the first reported case of ventricular septal defect, caused by catheter ablation of ventricular tachycardia. Most likely ventricular septal defect was associated with the steam pop during ablation at inferoapical septal position. Steam pops are infrequent in ventricular ablation and usually do not cause perforation. In a series of >4000 ablation lesions steam pops occurred in 62 lesions.
(1.5%) and cardiac perforation in only 1 of these cases (2%). Nevertheless, if perforation is caused by popping, the risk of need for surgical repair is higher, as it also was in this case.2

Disclosures
None.

References

Figure 2. Transesophageal echocardiographic short axis view of apical third of left and right ventricle without (A) and with (B) color-coded Doppler imaging, showing relevant left to right shunt. LV indicates left ventricle; and RV, right ventricle.

Figure 3. Contrast ventriculography in left anterior oblique projection: snapshot of end of diastole (A) and end of systole (B) showing relevant left to right shunt. Black arrows mark the borders of apical ventricular septal defect. LV indicates left ventricle; MA, mitral annulus; and RV, right ventricle.

Figure 4. A, After anterior left ventriculotomy, inferoapical 1.5×3 cm ventricular septal defect (VSD) is revealed. B, VSD is covered by 7×5 cm xenologic patch. VSD and patch are marked by white arrows.
Relevant Ventricular Septal Defect Caused by Steam Pop During Ablation of Premature Ventricular Contraction

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