

# Successful ablation of an epicardial ventricular tachycardia by video-assisted thoracoscopy

Tolga Aksu\*, Tumer Erdem Guler, and Kivanc Yalin

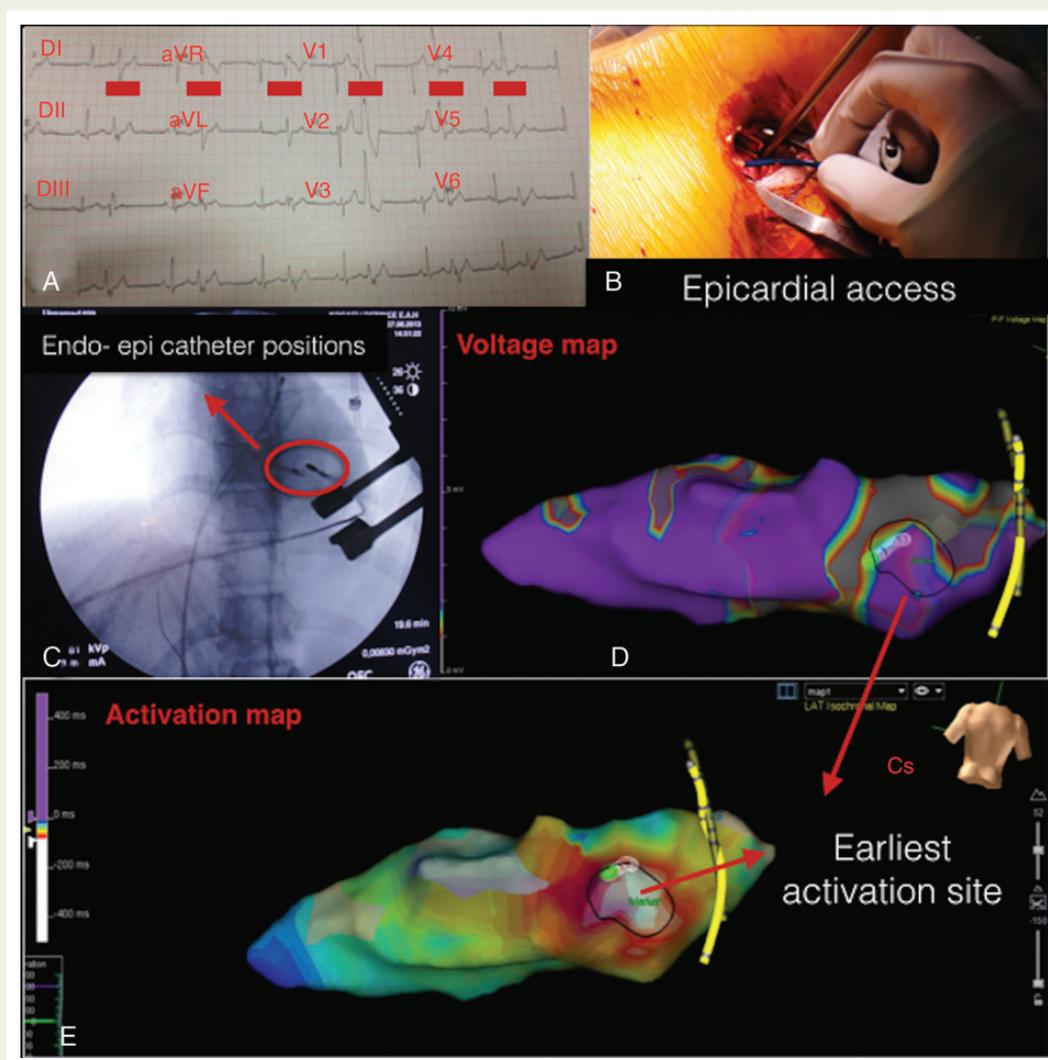
Kocaeli Derince Education and Research Hospital, Turkey

\*Corresponding author. T.el: +90 505 213 7131; E-mail address: aksutolga@gmail.com

We describe a 19-year-old patient with epicardial (EP) focal ventricular ectopy. Failure of ablation at the earliest activated endocardial site during ectopy suggested an EP origin. Epicardial ablation was not possible due to previous unsuccessful EP ablation. Video-assisted thoracoscopic RF ablation resulted in the termination of ventricular ectopy. After 2 years, the patient is still free from arrhythmias.

### Background

Despite the success of endocardial (EN) catheter ablation for treatment of idiopathic ventricular tachycardia (VT), occasional patients have been reported in whom VT could not be ablated from endocardium due to epicardial (EP) origin of the tachycardia.



**Figure 1** Figure of procedural details. Panel A shows 12-lead ECG of the patient, panel B shows epicardial access, panel C is the fluoroscopic.

## Case

A 19-year-old female was referred to us for monomorphic PVC and non-sustained monomorphic VT. The patient had undergone three failed EN and two combined EN and EP ablation attempts at another centre. An adequate EP ablation target had not been identified in these attempts.

The 12-lead ECG showed PVC with RBBB morphology (red lines in *Figure 1A*). Echocardiography showed decreased left ventricular function (LVEF 42%). Late gadolinium-enhanced MRI was revealed late enhancement of the left ventricle myocardium throughout the posterior wall. A combined EN and EP mapping procedure was planned. The site of earliest EN activation was localized at the postero-baso-lateral side of the LV on EN mapping (*Figure 1E*). Electroanatomic mapping of the left ventricular endocardium revealed a moderate antero to baso-lateral LV scar (*Figure 1D*).

A fluoroscopically guided pericardial puncture was performed, but the needle was not advanced due to adhesions. Therefore, we decided to attempt minimally invasive approach to facilitate access to the target area. The chest was entered in the left third interspace using a non-rib-spreading mini-thoracotomy with video-assisted thoracoscopy assistance (*Figure 1B and C*). Two 10-mm diameter thoracoscope with lens angulation of 30° were used for pericardial access. One port was used for direct visualization, and the other port provided the access of surgical instruments and ablation catheter. The pericardium was opened, and adhesions due to previous epi-ablation at the ablation target were dissected. Pericardial access site was very close to the EN earliest activation, earliest activation at epicardium was easily detected, and thus we did not need to map all the epicardium. Mapping with a cooled tip catheter was performed near the region of EN ablation catheter (*Figure 1C and E*). Pacing at this location produced greater than 90% pace-map match. After ablation and at 6 months follow-up, no further ectopy was noted.

## Discussion

Accessing the EP space is a useful tool for dealing with EP arrhythmias, especially VT, as in this case. Although the subxyphoid approach previously has been described extensively, the percutaneous subxyphoid approach might not be possible in patients with pericardial adhesions caused by prior cardiac surgery or repeated failed EP ablation.<sup>1</sup> Our case underwent multiple EN and combined EN-EP ablation procedure, which may result significant pericardial adhesions.

In individuals with pericardial adhesions, a hybrid procedure involving surgical access with a subxyphoid pericardial window and limited anterior or lateral thoracotomy might be a feasible and safe method of performing EP catheter ablation in the electrophysiology laboratory.<sup>2</sup> In our case, it was impossible to advance the guidewire into pericardial space due to intensive adhesions at subxyphoid region. Also, fluoroscopic view of EN earliest activation point was higher than subxyphoid region suggesting a higher access to the epicardium may facilitate the procedure. Thus, we preferred video-assisted thoracoscopic approach from the third intercostal space. To our knowledge, we are the first to use video-assisted thoracoscopy to treat focal VT. The technique allows reaching specific wide areas at the epicardium, we think that considering the EN earliest point may determine the accurate access to the epicardium by video-assisted thoracoscopy and it may be a useful tool to ablate VTs/PVSs originating from nearly all sites of the epicardium.

## References

1. Sosa E, Scanavacca M. Epicardial mapping and ablation techniques to control ventricular tachycardia. *J Cardiovasc Electrophysiol* 2005;**16**:449–52.
2. Michowitz Y, Mathuria N, Tung R, Esmailian F, Kwon M, Nakahara S *et al*. Hybrid procedures for epicardial catheter ablation of ventricular tachycardia: Value of surgical access. *Heart Rhythm* 2010;**7**:1635–43.