Epicardial Access for Ventricular Tachycardia Ablation: Experience With the Needle-in-needle Technique

Acceso epicárdico para ablación de taquicardia ventricular: experiencia con la técnica de micropunción

To the Editor,

Ventricular tachycardias are an increasingly common ablation target in electrophysiology laboratories, pose major challenges due to the presence of complex substrates, and often require multiple access sites. The epicardial substrate is accessible via percutaneous puncture using the Sosa technique,[1] first described more than 20 years ago. In Spain, 14% of ventricular tachycardia ablation procedures are currently performed via an epicardial approach, and it is more frequently used in nonischemic cardiomyopathy (25.3% of cases) than in ischemic (9.2% of cases).[2] In the last 2 decades, operators have gained experience and confidence in percutaneous epicardial access, but complications remain, some of which are potentially fatal. Subxiphoid epicardial puncture is performed with an 18-G Tuohy needle (Braun, Kronberg, Germany), an epidural puncture needle with a curved tip that has now become the standard for epicardial access. Epicardial puncture is still a challenge, with a complication rate of 5% to 20%. It is thus only performed in specific centers with experience and on-site surgical facilities. One series reported a 10% rate of severe hemopericardium treated with pericardial drainage.[3] In another study of 218 patients managed with the Sosa technique, cardiac tamponade occurred in 8 patients (3.7%), which was resolved with pericardial drainage in 6 patients and with emergent surgery in 2.[4] Other complications of epicardial access, rare but very serious, are hepatic puncture with hemoperitoneum, laceration of a vein or coronary artery, or right ventricular (RV)-abdominal fistula.

The needle-in-needle technique has recently been developed for epicardial access using a needle of much smaller caliber and with considerable potential in terms of safety.[4] The needle-in-needle technique is based on puncture with a thin needle (21 G) that is supported inside a larger-bore (18 G) needle. Here, we describe our experience with using the needle-in-needle technique to obtain epicardial access.

From July 2015 to October 2018, ventricular tachycardia ablation was performed in 19 consecutive patients using the needle-in-needle technique and an epicardial approach.

In this technique, the external 18-G needle is advanced under the xiphoid process. Once the 18-G needle is positioned, the 21-G micropuncture needle is inserted (Mini Access Kit, 21G-L.150 mm, Merit; Utah, United States), advanced until the heartbeat is felt, and introduced into the pericardial space. Radiopaque contrast agent is injected to confirm the optimal location and then a 0.018-inch guidewire is advanced (Nitrex, 0.018 in-L.180 cm; Minnesota, United States) inside the micropuncture needle. Once its correct location within the pericardial space is verified, the needle is withdrawn, a flexible introducer is advanced, and the 0.018-inch guidewire is exchanged for a 0.032-inch wire, on which a standard 8-Fr introducer can be advanced.

Table 1 shows the characteristics of the patients requiring epicardial access in our center using the needle-in-needle technique. The predominant heart disease was idiopathic dilated cardiomyopathy (58%). Epicardial access with the needle-in-needle technique was successful in 17 of 19 patients (89%). There were no incidences of hemopericardium, and no patient required pericardial drainage. In 1 patient, the hardness of the diaphragm resisted the passage of such a fine needle, requiring the use of a conventional Tuohy needle. In another patient, significant pericardial adhesions impeded epicardial access and a surgical approach was required. Another patient experienced inadvertent RV puncture, and the

Table 1
Characteristics of patients managed using needle-in-needle epicardial access

Age, y	BMI	Sex	Etiology	LVEF, %	Successful, %	Hemodynamic support	Complications
77	31	M	DCM	32	Yes	No	
31	27	M	Myocarditis	68	Yes	No	
66	31	W	DCM	29	Yes	No	
71	35	W	DCM	26	Yes	No	
34	25	M	ARVD	70	Yes	No	
25	26	W	DCM	42	Yes	No	
72	27	M	DCM	43	Yes	No	
57	26	M	IHD	28	Yes	No	
46	27	M	DCM	45	Yes	No	
68	25	M	DCM	24	Yes	ECMO	
72	26	M	DCM	35	Yes	No	Rupture of the 0.014-inch guidewire in the RV and migration of the distal segment to the AP. Subsequent epicardial access without incident and ablation completed successfully
57	35	M	DCM	35	Yes	No	
57	26	M	IHD	28	Yes	ECMO	
48	24	M	IHD	30	No	ECMO	Change to Tuohy needle. Very hard tissue
42	26	M	IHD	63	Yes	No	
79	24	M	DCM	12	Yes	No	
73	29	M	IHD	34	Yes	No	
63	27	M	IHD	36	No	No	Severe pericardial adhesions. Surgical access required
66	26	M	DCM	36	Yes	No	

ARVD, arrhythmogenic right ventricular dysplasia; BMI, body mass index; DCM, dilated cardiomyopathy; ECMO, extracorporeal membrane oxygenation; IHD, ischemic heart disease; LVEF, left ventricular ejection fraction; M, man; PA, pulmonary artery; RV, right ventricle; W, woman.

0.018-inch guidewire was advanced into the cavity. When the guidewire was removed, it caught the end of the needle, split into 2 fragments, and caused embolization of the distal fragment. The same micropuncture needle provided access to the epicardium, and the procedure was successfully completed. The next day, the distal fragment of the 0.018-inch guidewire was removed with a loop catheter, without further problems or hemopericardium.

In our experience, as well as in the literature, the needle-in-needle technique is the safest way to obtain epicardial access, and no cases have been reported of hemopericardium with tamponade or the need for cardiac surgery.

Kumar et al.[5] described the needle-in-needle micropuncture technique for the first time in 2015, comparing their series of 23 patients with a retrospective group of 291 patients managed with the Sosa technique. In the retrospective group, 5 patients (1.7%) required emergent surgery due to severe hemopericardium and 1 died. In contrast, none of the hemopericardia due to the needle-in-needle technique required surgical intervention. In the largest published study, the incidence of severe hemopericardium was significantly higher in the 18-G needle group than in the micropuncture needle group (8.1% vs 0.9%; $P < .001$), and 42% of these patients with inadvertent RV puncture required cardiac surgery. No patient with inadvertent RV puncture managed using the needle-in-needle technique required surgery.[6]

Our results show that epicardial access through the needle-in-needle technique can be achieved in a very safe and largely trauma-free way. There were no cases of significant hemopericardium, abdominal bleeding, or RV or epicardial coronary artery damage. This technique provides the operator with increased confidence and helps to reduce the stress associated with pericardial puncture. It may also be useful to improve the safety of conventional pericardiocentesis, particularly in patients with little pericardial effusion, whose risk of RV puncture is higher.

Ignasi Anguera,* Marta Aceña, Zoraida Moreno-Weidmann, Paolo D. Dallaglio, Andrea Di Marco, and Marcos Rodríguez

Unidad de Arritmias, Servicio de Cardiología, Área del Corazón, Hospital Universitario de Bellvitge, IDIBELL, L'Hospitalet de Llobregat, Barcelona, Spain

* Corresponding author:
E-mail address: ianguera@bellvitgehospital.cat (I. Anguera).

Available online 05 April 2019

REFERENCES

1. Sosa E, Scanavacca M, d'Avila A, Pilleggi F. A new technique to perform epicardial mapping in the electrophysiology laboratory. *J Cardiovasc Electrophysiol.* 1996;7:531–536.
2. García-Fernández FJ, Ibáñez JL, Quesada A; Spanish Catheter Ablation Registry. 17th Official Report of the Spanish Society of Cardiology Working Group on Electrophysiology and Arrhythmias (2017). *Rev Esp Cardiol.* 2018;71:941–951.
3. Sacher F, Roberts-Thomson K, Maury P, et al. Epicardial ventricular tachycardia ablation: a multicenter safety study. *J Am Coll Cardiol.* 2010;55:2366–2372.
4. Della Bella P, Brugada J, Zeppenfeld K, et al. Epicardial ablation for ventricular tachycardia: a European multicenter study. *Circ Arrhythm Electrophysiol.* 2011;4:653–659.
5. Kumar S, Bazaz R, Barbhaiya CR, et al. Needle-in-needle" epicardial access: preliminary observations with a modified technique for facilitating epicardial interventional procedures. *Heart Rhythm.* 2015;12:1691–1697.
6. Gunda S, Reddy M, Pillarisetti J, et al. Differences in complication rates between large bore needle and a long micropuncture needle during epicardial access: time to change clinical practice? *Circ Arrhythm Electrophysiol.* 2015;8:890–895.

https://doi.org/10.1016/j.rec.2019.03.003
1885-5857/

Safety of a Very Early Discharge Strategy for ST-segment Elevation Acute Coronary Syndrome

Seguridad de una estrategia de alta muy precoz en el síndrome coronario agudo con elevación del segmento ST

To the Editor,

Hospital length of stay for ST-segment elevation acute coronary syndrome (STEACS) has traditionally been determined by the need to monitor electrical and mechanical complications during the infarction and after revascularization. However, with the increasing standardization of primary angioplasty as the treatment of choice and the establishment of emergency treatment networks, survival has increased significantly, and this has been accompanied by a reduction in the complications associated with these events.[1,2] The current clinical practice guidelines of the European Society of Cardiology recommend assessment for discharge in the first 48-72 hours for low-risk patients who are able to start cardiac rehabilitation early with access to suitable follow-up.[3] While there are data supporting early discharge for this patient subgroup,[4] to date no study has evaluated strategies for discharge of STEACS patients within 48 hours. Given the negligible rate of mechanical complications in low-risk patients,[1] we sought to determine the safety of discharge after a hospital stay shorter than 48 hours (a maximum of 2 nights) and secondarily to assess whether this policy would bring significant cost savings.

We prospectively selected all consecutive patients admitted between January 2017 and October 2018 for ST-segment elevation acute myocardial infarction who were assessed as being at low risk. The criteria used to define low risk are listed in Table 1. The principal study aim was to assess the 30-day occurrence of any severe adverse event indicating that the patient might have been managed more appropriately under a more cautious discharge policy. The severe adverse advents considered were myocardial reinfarction, stent thrombosis, major bleeding, rehospitalization for any cause, stroke, and death from any cause. During predischarge consultation, all patients were instructed by the attending physician about the nature of their disease and received precise guidance about health care, medication, and the follow-up schedule.

Hospitalization costs were estimated from the Community of Madrid price list for public services and activities (*Orden* 727/2017). This document provides cost estimates for a primary angioplasty procedure and daily hospitalization for acute coronary syndrome in a coronary unit. We used the daily cost to obtain the hourly cost. The outcome measure was the per-patient cost reduction, calculated from the difference in hospitalization hours relative to a standard hospital stay of 72 hours.