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Authors: Bartosz Sadownik, Piotr Nowakowski, Marcin Michalak, Paweł Andruszkiewicz, Marcin Grabowski

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Regional anesthesia of the hemithorax for the implantation of a subcutaneous implantable cardioverter-defibrillator (S-ICD)

Bartosz Sadownik\textsuperscript{1,2}, Piotr Nowakowski\textsuperscript{1}, Marcin Michalak\textsuperscript{3}, Paweł Andruszkiewicz\textsuperscript{1}, Marcin Grabowski\textsuperscript{3}

\textsuperscript{1}2nd Department of Anesthesiology and Intensive Care, Medical University of Warsaw, Warsaw, Poland
\textsuperscript{2}Department of Descriptive and Clinical Anatomy, Medical University of Warsaw, Warsaw, Poland
\textsuperscript{3}1st Department of Cardiology, Medical University of Warsaw, Warsaw, Poland

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Corresponding author at:
Bartosz Sadownik, M.D.
2nd Department of Anesthesiology and Intensive Care, Medical University of Warsaw, Banacha 1a Street, Warsaw 02-097, Poland.
Tel. +48 22 599 20 02 Fax. +48 22 599 21 01
Email: bsadownik@wum.edu.pl

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33-year-old man was qualified for implantation of a subcutaneous implantable cardioverter-defibrillator (S-ICD) in primary prevention of sudden cardiac death[1,2]. The procedure was performed under regional anesthesia of the hemithorax, with combined ultrasound-guided Serratus Anterior Plane Block (SAPB)[3], Pectoral Nerves Blocks II (PECSII) and Parasternal Block (PSB). The first implantation of S-ICD without general anesthesia was described by Droghetti et al. in 2018[4]. We present a modified method of regional anesthesia for the three-incision intermuscular technique. PECSII was performed instead of PSB at the level of 2nd rib[5]. Compared with described procedure[4] the total dose of local anesthetics was reduced by using a solution of 0.125% bupivacaine 1 mg/kg. The 1% lidocaine for infiltration of skin incision was performed by the operator. Paracetamol 1 g orally and dexamethasone 0.1 mg/kg intravenous was given 1 hour before the start of regional anesthesia as premedication. After verification of the S-ICD location under fluoroscopy, the incision and tunneling lines were marked (Figure 1A). Under full sterile conditions for each block, after skin infiltration with 1% lidocaine, 80 mm 22G Stimuplex B.Braun needle was inserted into interfascial plane under ultrasound-guidance with in-plane technique. Ultrasound was carried out with an EPIQ 7C system (Philips Ultrasound, Bothell, WA, USA) with a 12-MHz linear transducer. The informed consent for procedure and image publication was obtained.

**Serratus Anterior Plane Block (SAPB)**

The patient was placed on his right side with left hand raised above head. The US-probe was placed in the frontal plane in the posterior axillary line. After identifying serratus anterior (SAM) and lattissimus dorsi (LDM) muscles (Figure 1B), a needle was inserted into interfascial plane two intercostal spaces above the incision line. 30 ml 0.125% bupivacaine was injected (Figure 1C).

**Pectoral Nerves Blocks II (PECSII)**

The patient was in the supine position, the US probe was placed in the sagittal plane in the left
mid-clavicular line at the level of the 2nd rib. After identifying pectoralis muscles (Figure 1D), 5 ml 0.125% bupivacaine was deposited above and below the pectoralis minor muscle.

**Parasternal Block (PSB)**

The ultrasound probe was placed in the sagittal plane at the level of the 5th rib laterally to the left sternal line. The posterior lamina of pectoral fascia was identified and 7 ml of 0.125% bupivacaine was deposited inferiorly.

The operation began 35 minutes after the regional anesthesia was performed. Sedation during surgery was obtained by intravenous infusion of dexmetomidine in the range of 0.03-1.0 µg/kg/h without loading dose and fentanyl 0.05 µg/kg/min (Ramsey Sedation Score 3-4). Intraoperatively, metamizole 2,5 g was administered intravenously. Oxygen was supplied by nasal cannula. Basic monitoring was provided (ECG, SpO2, NIBP, RR). The variability of heart rate and blood pressure was below 10% relative to baseline. Before pacing-induced ventricular fibrillation intravenous infusion of 0.5 mg/kg propofol was administered to sedate patient (RSS 5). Two hours after the procedure, the patient assessed the comfort during the operation as high and confirmed that he would agree again to the method of anesthesia used. In the 30-day follow-up no complications were found. The video materials are available in the supplementary.
References:


**Figure 1.**

A. Incision line were marked, tunneling lines (dotted line), injection points for Serratus Anterior Plane Block Superficial (*), Pectoral Nerves Blocks II (**) and Parasternal Block (***)

B. Serratus anterior muscle (SAM), lattissimus dorsi muscle (LDM), thoracodorsal artery (red in Color Doppler), interfascial plane (arrow). Before each insertion of needle, blood vessels were assessed and identified for elimination the risk of accidental injury.

C. Serratus anterior muscle (SAM), lattissimus dorsi muscle (LDM), local anesthetic (LA) The position of the tip of the needle (arrow) was confirmed by low resistance infusion of saline solution and enlargement of biconvex-shape hydrodissection of the interfascial planes during infusion.

D. Pectoralis major muscle (PMM) and pectoralis minor muscle (pmm). In Pectoral Nerves Blocks II local anesthetic was deposited in interfascial planes (arrows).