Introduction: There is still no standard concept for ICD implantation in infants and smaller children. The previously described extracardiac technique offers an effective and safe concept of an ICD implantation in this special patient group. However, data of midterm follow-up are lacking, especially the course of the DFT facing further growth of the patients.

Patients and methods: An extracardiac ICD-system was implanted in 28 patients (mean age: 5.1 [0.2-11.5] years; mean body length: 107 [61-147] cm) as previously described. Under fluoroscopic guidance a defibrillator lead was tunneled subcutaneously (n=8) or subpleurally (n=23, including 3 patients with a former subcutaneous lead) along the course of the 6th rib until almost reaching the vertebral column and bipolar steroid-eluting sensing and pacing leads were sutured to the ventricle. The ICD device was implanted as “active can” in the right upper abdomen or inserted in a horizontal position between the diaphragm and the pericardium. Sensing, pacing, and defibrillation thresholds (DFT) as well as impedances were verified intraoperatively, 3 months later and every 12 months, respectively.

Results: In 30/31 ICD implantations using the extracardiac technique an intraoperative DFT < 15 J (median DFT 10 [5-15] J) between the extracardiac lead and device could be achieved. However, rise of the median DFT was noted from 10 J intraoperatively to 15 J after 1 year. There was a significant correlation between the DFT and body length but not between DFT and body weight. After a mean follow-up of 2.5 years, revision was required in 5/7 patients with a subcutaneous defibrillation lead and in 5/23 with a subpleural lead. Reason for revision were lead problems (n=3, all with subcutaneous leads), device infection (n=1) and inadequate ventricular sensing (n=1), respectively. In the remaining 5 patients, increase of the DFT > 20 J was noted during regular DFT testing without change of the impedance of the shock electrode or any signs of dislocation or fracture of the defibrillation coil.

Conclusions: The extracardiac technique offers a safe and effective approach for ICD implantation in infants and small children. However, regular DFT testing is mandatory to recognize failure of the system.