Značajna redukcija doze zračenja tijekom elektrofizioloških postupaka primjenom novog radiološkog sustava

Significant reduction of radiation exposure during electrophysiological procedures through the use of novel angiography system

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UVOD: Izloženost zračenju značajno je smanjena za određene elektrofiziološke postupke korištenjem 3D *mapping* sustava, međutim ono je i dalje neizbježno za većinu postupaka. Naš cilj bio je prikazati utjecaj novog radiološkog uređaja na doze zračenja tijekom elektrofizioloških postupaka.

PACIJENTI I METODE: 183 bolesnika predviđenih za ablaciju ili implantaciju elektrostimulatora/kardioverter-defibrilatora uključeno je u ispitivanje. Postupci su učinjeni u dva laboratorija. Jedan je opremljen novim Artis Q.zen sustavom (AQZ, n=93) dok je drugi opremljen Artis zee sustavom (AZ, n=90) (Siemens, Forchheim, Njemačka). Bolesnici su podijeljeni u četiri grupe – izolacija plućnih vena, ablacija supraventrikularna tahikardije, implantacija srčane resinkronizacijske terapije i implantacija elektrostimulatora/kardioverter-defibrilatora srca. Kod svih bolesnika korištene su standardizirane postavke za fluoroskopiju i cine akviziciju. Doze zračenja su uspoređivane ukupno za svaki uređaj, kao i u svakoj grupi odvojeno.

REZULTATI: Osnovne karakteristike bolesnika kao i postupaka (trajanje postupka, trajanje fluoroskopije i cine akvizicije) nisu se značajno razlikovali. Totalni DAP (dose area product) i air kerma su značajno sniženi kod svih postupaka koji su učinjeni AQZ sustavom (1068 naspram 1730 $\mu\text{Gy}\cdot\text{m}^2$, $p=0.169$, and 87.5 naspram 172.4 Gy, $p=0.019$). Razlika u dozama između dva sustava je bila najznačajnija za cine akvizicije s prosječno 70% redukcijom doze.

ZAKLJUČAK: Korištenjem novog radiološkog uređaja značajno su snižene doze ekspozicije bolesnika. Nova tehnologija dodatno poboljšava sigurnost elektrofizioloških procedura koje zahtijevaju radiološke uređaje.

INTRODUCTION: Although radiation exposure has been reduced for some electrophysiological procedures (EP) by the use of mapping systems it still remains a concern for electrophysiologists. The aim was to evaluate the impact of a novel X-ray technology on the radiation doses during EP procedures.

PATIENTS AND METHODS: 183 consecutive patients undergoing ablation procedures or implantations of cardiovascular implantable devices were included. Procedures were performed using the Artis Q.zen (AQZ, n=93) and the Artis zee (AZ, n=90) X-ray systems (Siemens, Forchheim, Germany). Patients were categorized into four procedure groups – pulmonary vein isolation, supraventricular tachycardia ablation, cardiac resynchronization therapy device implantation and pacemaker/implantable cardioverter defibrillator implantation. For all patients standardized settings for fluoroscopy and cine acquisitions were used. Radiation exposure was compared in total and in every group separately.

RESULTS: The baseline patient parameters and procedural parameters, namely the procedure duration, the fluoroscopy and cine time were similar between the two systems. The total dose area product and the air kerma across all procedures was reduced by the use of the AQZ angiography system (1068 versus 1730 $\mu\text{Gy}\cdot\text{m}^2$, $p=0.169$, and 87.5 versus 172.4 Gy, $p=0.019$). The difference between the two systems was greatest for cine acquisition with roughly 70% for all radiological parameters of the exposure.

CONCLUSIONS: Use of novel X-ray technology for standard EP procedures significantly reduces patient doses. The use of this technology further improves safety of angiography based EP procedures.

LITERATURE

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