



Overhead arm support reduces radiation exposure during complex endovascular aortic repair

• Amit Pujari, MD Myra Ahmad, BA Matthew P. Sweet, MD, MS Sara L. Zettervall, MD, MPH

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Abstract

Background

Complex endovascular aortic surgery has been associated with increased fluoroscopic radiation exposure. The radiation dosage necessary for visualization is dependent on the amount of tissue penetration required. Elevation of a patient's arms above their head during endovascular surgery could improve visualization by removing the arms from the field of view. Furthermore, it might reduce the radiation dose required. In the present study, we sought to determine the effect of arm elevation on radiation exposure during endovascular treatment of thoracoabdominal aneurysms.

Methods

All patients enrolled in a single-institution, physician-sponsored investigational device exemption study for endovascular treatment of thoracoabdominal aneurysms (fenestrated/branched endovascular aortic repair [F/BEVAR]) from 2012 to 2022 were assessed. The first 30 patients treated were excluded to account for the learning curve required with treatment. Patients treated after December 2020 were positioned with their arms elevated above their head using an overhead arm support (OAS). These patients were compared with those who had undergone F/BEVAR before the practice change. The radiation dose, fluoroscopy time, and contrast volume used were compared. A subgroup analysis was performed to assess the effect for patients with brachial access.

Results

A total of 145 patients were included in the present study, of whom 43 (30%) had undergone F/BEVAR with their arms supported overhead. No differences were identified in age, body mass index, aneurysm size, or prior aortic intervention between the groups with and without the use of the OAS. A history of dissection (23% vs 7.8%; $P = .01$) was more frequent for the patients treated with their arms elevated. Arm elevation was associated with a significant reduction in the mean radiation exposure (2261 vs 3100 mGy; $P = .01$). No differences were observed in the fluoroscopy time or contrast volume used between the two groups. In addition, no patient experienced palsy of the brachial plexus. Of the 145 patients, 55 (38%) had required brachial arterial access, limiting their ability to elevate both arms. In the subgroup analysis, the patients without brachial access continued to show a significant reduction in radiation exposure with arm elevation (2159 vs 3179 mGy; $P < .01$).

Conclusions

Elevation of a patient's arms above their head using an OAS during F/BEVAR offered a low-cost, simple strategy that resulted in a 30% reduction in radiation exposure without added complications. This technique improved visualization and reduced radiation exposure for patients and physicians and should be included in abdominal aortic and visceral procedures work to improve patient and surgeon safety.