

Authorization of The Ethical Committee of Tianjin

Medical University General Hospital

Ethical NO. IRB2020-WZ-033

Article title: Application of hybrid operating rooms for treating spinal dural arteriovenous fistula

Corresponding author:
Wen-Qiang Xin

First Authors:
Nai Zhang

Application departments:
Department of neurosurgery

Assume unit: Tianjin Medical University
General Hospital

Application date: 03, 2020

Abstract:

AIM: A hybrid operating room (hybrid-OR) is a surgical space that combines a conventional operating room with advanced medical imaging devices. To explore and summarize the technical features and effectiveness of the application of a hybrid-OR in dealing with spinal dural arteriovenous fistulas (SDAVFs).

METHODS: The Department of Neurosurgery in our hospital treated 11 patients with SDAVFs between January 2015 and December 2018 with the use of a hybrid-OR. The dual-marker localization technique was used in the hybrid-OR to locate the SDAVFs and skin incision, and the interoperative digital subtraction angiography (DSA) technique was used before and after microsurgical ligation of the fistulae in the hybrid-OR to verify the accuracy of obliteration. The patients were followed for an average of 2 years after the operation, and the preoperative American Spinal Cord Injury Association (ASIA) scores and postoperative ASIA scores at 6 months after the operation were compared.

RESULTS: The location and skin incision of the SDAVFs were accurately obtained by using the dual-marker localization technique in the hybrid-OR in all patients, and there were no cases that required expansion of the range of the bone window in order to expose the lesions. Intraoperative error obliteration occurred and was identified in 2 patients by using the intraoperative DSA technique; therefore, the findings provided by the intraoperative DSA system significantly changed the surgical procedure in these 2 patients. With the assistance of the hybrid-OR, the feeding artery was correctly ligated in all cases, and the intraoperative error obliteration rate decreased from 18.2% (2/11) to 0%. All 11 patients were followed for an average of 2 years. The ASIA scores at 6 months after the operation were significantly improved compared with the preoperative ASIA scores, and there were no patients with late recurrence during the follow-up.

CONCLUSION: Compared with intra-arterial embolization for the treatment of SDAVFs, hybrid-ORs can solve the problem of a higher incidence of initial failure and late recurrence. Compared with direct occlusion of SDAVFs in microsurgery, hybrid-ORs can take advantage of the intraoperative DSA system for locating the shunt and verifying the obliteration of fistulae in order to reduce the error obliteration rate. At this point, our experience suggests that the safety and ease of use make hybrid-ORs combined with microsurgery and intraoperative DSA systems an attractive modality for dealing with SDAVFs.

Comments of Examination: After examination, "Application of hybrid operating rooms for treating spinal dural arteriovenous fistula", conform "International ethical guidelines for biomedical research involving human subjects (2002)" developed by Council For International Organizations Of Medical Sciences (CIOMS) in collaboration with World Health Organization (WHO), researchs in this article are approved:

Ethical Committee
Tianjin Medical University General Hospital
Tianjin, China

03,2020