

## Patient and Staff Radiation Exposure in Hybrid OR



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New research shows that working conditions in a vascular hybrid operating room (HOR) are safe in terms of patient and staff radiation protection. However, researchers say doses are highly dependent on the workload and further research is needed to evaluate any possible radiological deviation of the daily working conditions in the HOR. The findings are published in the journal *Physica Medica*.

A new concept in operating room design allows vascular surgery patients to receive multiple levels of care within a single operating room. The new hybrid operating rooms (HORs), equipped with robotic angiography systems and several high-definition monitors, enable physicians to perform the most advanced vascular and surgical procedures with a high level of sterility and virtually unrestricted freedom-of-movement radiological images.

These interventional procedures, in addition to other diagnostic imaging modalities (such as CT) contribute significantly to manmade exposure of the population. This study aimed to characterise the radiation exposure to patients and medical staff in a new vascular HOR during x-ray-guided procedures. Data from 260 interventions performed in a new HOR equipped with a Siemens Artis Zeego angiography system were monitored for a one-year period. Patient doses were analysed using these parameters: radiation time, kerma-area product, patient entrance reference point dose and peak skin dose. Staff radiation exposure and ambient dose equivalent were also measured using direct reading dosimeters and thermoluminescent dosimeters.

**See Also:** [Interoperability Standards for Medical Device Integration in the OR](#)

Results showed that radiation time, kerma-area product, patient entrance reference point dose and peak skin dose were, on average, 19:15 minutes, 67 Gy cm<sup>2</sup>, 0.41 Gy and 0.23 Gy, respectively. Although the contribution of the acquisition mode was smaller than 5 percent in terms of the radiation time, this mode accounted for more than 60 percent of the effective dose per patient. All of the staff dose measurements remained below the limits established by law.

"These results allow us to establish reference levels for interventional procedures in our HOR. They also help to identify unusually high levels, thus increasing practitioner awareness of patient dose values and radiation protection. The large range of exposure values makes it necessary to classify the procedures by level of difficulty and set a dose reference level for each one," the authors write.

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