

PHILIPS

Healthcare

Zenition Series



Who/Where

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Challenge

Obtain high quality imaging from a mobile C-arm system to support EVAR stent grafting procedures in a conventional operating room.

Equipment

Philips Zenition 70 mobile C-arm with Flat Detector technology and Unify workflow.

Results

The Zenition 70 provides flexible and high quality fluoroscopic imaging to aid precise stent grafting during long EVAR procedures, while reducing radiation exposure.

Value of Philips Zenition 70 in stent grafting

Saiseikai Shiga Hospital and the Philips Zenition experience

Clinical challenges of EVAR procedures

The Saiseikai Shiga Hospital opened its Department of Cardiovascular Surgery in January 2020, and started using stent grafting (endovascular aortic repair, EVAR) for abdominal aortic and iliac aneurysms in April of the same year. Treatment of aortic aneurysms has in recent years developed to include proactive endovascular treatment in addition to conventional vascular prosthesis and aortic aneurysm repair via thoracotomy or laparotomy. This is prompted by an aging patient population and consequent increase in number of patients with complications and previous surgeries (history of thoracotomy or laparotomy), plus increased experience with stent grafting and consequent improvement in long-term outcomes.

While stent grafting has good short-term outcomes, repeat treatment can be required over the long term because of issues like endoleaks or stent graft migration. This is why many surgeons not only avoid leaving any Type I or III endoleaks during surgery, but also aim to prevent postoperative Type II endoleaks, stent graft migration, and other issues in order to improve long-term prognosis. Surgeons in the Cardiovascular Surgery Department at this hospital also take care to embolize the relatively thick lumbar and inferior mesenteric arteries whenever feasible, and to shape stent grafts to vessel wall curves as closely as possible.



Key features of Zenition 70

- Compact fourth generation flat detector visualizes complex structures with exceptional clarity and dose control
- Engineered for continuous imaging with enhanced heat management to support longer and complex procedures
- In a user study¹ the touch control and navigational aids of Unify workflow reduced miscommunication by almost half
- The Zenition user interface is so easy, it scored in the top 12% for best system usability¹.

Need for high quality mobile C-arm imaging in ORs

“We prefer to perform EVAR in the operating room (OR), both from the standpoint of infection prevention and availability of lighting equipment that minimizes shadows. It also allows us to perform open surgery if a problem should arise,” says Dr. Fumihiro Miyashita, Chief Surgeon, Cardiovascular Surgery.

EVAR at Saiseikai Shiga Hospital is therefore carried out in conventional operating rooms, which causes issues with fluoroscopy equipment. In recent years, an increasing number of hospitals are performing stent grafting in hybrid operating rooms that combine suspended angiography equipment with the functionality of a conventional operating room.

Performing stent grafting in a conventional OR without any issues

“Setting these rooms up is often problematic due to cost and facility conditions,” says Dr. Miyashita. “Adding a mobile angiography C-arm like the Philips Zenition 70 and attaching a carbon extension to the operating table allows us to perform stent grafting in a conventional operating room without any issues.”

Compact and flexible

The Saiseikai Shiga Hospital has 10 operating rooms of different sizes. “Zenition Series systems are remarkably compact, so can be used in most operating rooms without interfering with other devices,” says Dr. Miyashita. “Power can

be a concern for compact systems, but despite its small X-ray tube the Zenition 70 can continue imaging over long periods of time without overheating. The small X-ray tube also has the advantage of allowing the surgeon to adjust the angle of the tube without interfering with the operating table.”

Fast and intuitive use

Endovascular treatment entails moving the wire and catheter while watching fluoroscopy imaging, so there must be no delay in image display. “The Zenition 70 has almost no delay between pressing the fluoroscopy footswitch and visualizing the image, and the system’s compact size makes it easier to follow the tip of the wire with the C-arm. It also has a flat panel detector that can capture high quality fluoroscopy images while limiting radiation exposure,” says Dr. Miyashita. “EVAR often requires adjusting the angle of the tube. The manually operated C-arm makes the angle intuitive, and we feel that the time between instruction from the surgeon and display of target images is shorter.”

Helping patients return to their normal lives with ease

“At the Saiseikai Shiga Hospital, our goal is to provide stent grafting that not only ensures that elderly individuals like the patient mentioned in the case study can return to their normal lives with ease, but also eliminate the need for repeat treatment,” says Dr. Miyashita. “By using the Zenition 70 mobile C-arm, we hope to provide truly minimally invasive treatment with high quality fluoroscopic imaging and precise stent grafting, while also reducing radiation exposure.”

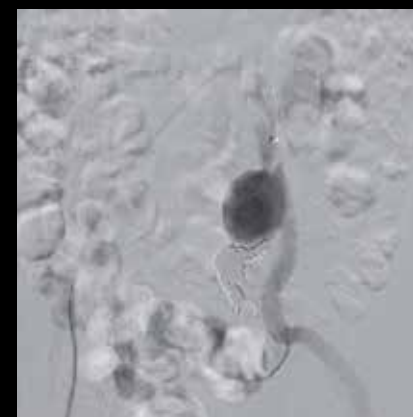


Case Study

This patient was a 91- year-old man. He was independent in terms of ADL, but had a history of sigmoid colon cancer resection. In view of his advanced age and history of laparotomy, the team decided to treat him with EVAR.

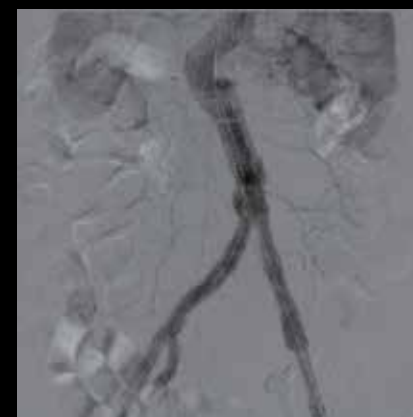
A pre-operative contrast CT scan showed an infrarenal abdominal aortic aneurysm measuring 50 mm, and a left internal iliac artery aneurysm measuring 30 mm. The patient exhibited marked central neck angulation (Fig. 1). Although no conspicuous blood flow from the lumbar arteries or the inferior mesenteric artery was observed for this patient, it was decided to first perform embolization in order to prevent a Type II endoleak from the left internal iliac artery.

Figure 1: Pre-operative contrast CT scan showed an infrarenal abdominal aortic aneurysm



The distal left internal iliac artery was embolized percutaneously (via puncture of the right common femoral artery) using coils (Fig. 2) with the assistance of a physician from the Radiology Department, and the patient was temporarily discharged the day after surgery.

Figure 2: Zenition imaging of right common femoral artery



Contrast imaging was performed on the Zenition after the procedure for confirmation and no endoleaks were found (Fig. 4).

Figure 4: Zenition post-op contrast imaging confirmed no endoleaks



After readmission, the patient underwent EVAR in the operating room under general anesthesia. The device used was a Medtronic Endurant II. After deploying the first two stents, the tip of the stent graft was secured to the central landing of the main body by opening the suprarenal stent. The entire system was then pushed in and placed along the aortic bend by deploying the stent (Figs. 3-1, 3-2). The legs were positioned such that the left extended to the proximal external iliac artery and the right extended to the distal common iliac artery.

Figure 3-1: Zenition visualization of multiple stent deployment



Figure 3-2: Zenition visualization of multiple stent deployment



A post-operative contrast-enhanced CT showed no endoleaks (Fig. 5), and the patient was discharged in ambulatory condition 6 days after surgery.

Total fluoroscopy time was 36:09 min, frame rate was 7.5 fps during fluoroscopy and 2 fps during imaging run. Dose level was low and the fluoroscopy dose was 186 mGy.

Figure 5: Post-op contrast-enhanced CT showed no endoleaks



¹ Results obtained during user tests performed in November 2013 by Use-Lab GmbH, an independent company. The tests involved 30 USA based clinicians (15 physicians teamed up with 15 nurses or X-ray technicians), who performed simulated procedures in a simulated OR environment. None of them had worked with a Philips C-arm or with each other before.

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