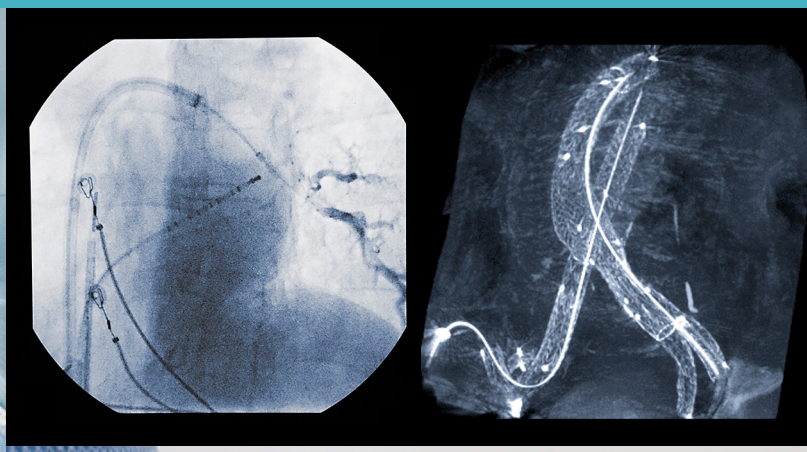
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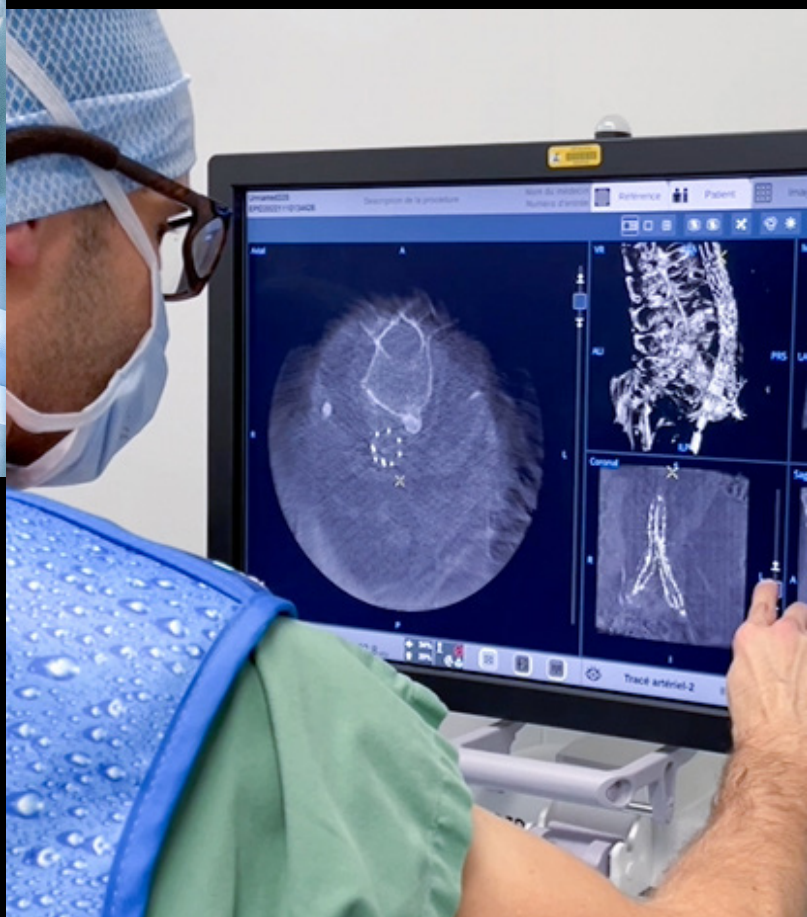
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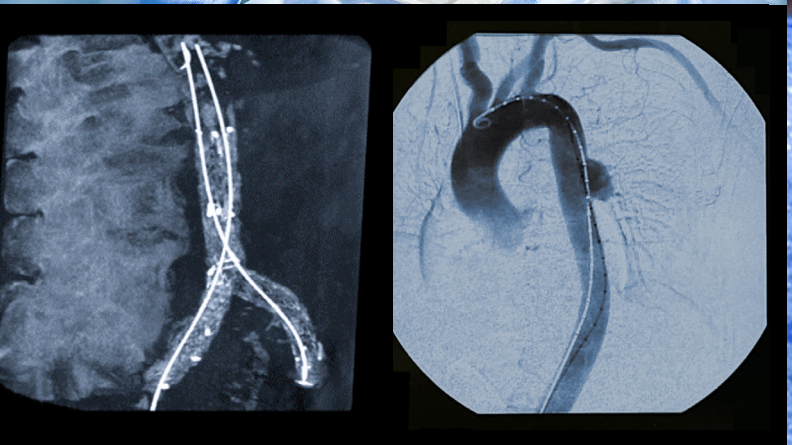
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Innovation in Surgical Imaging with OEC C-arms

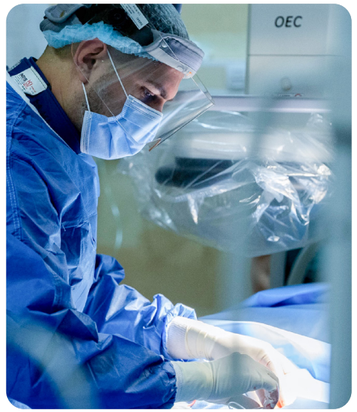








OEC Magazine



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Cryoablation, an Electrophysiology (EP) Procedure with OEC Elite CFD Motorized Cardiac C-arm

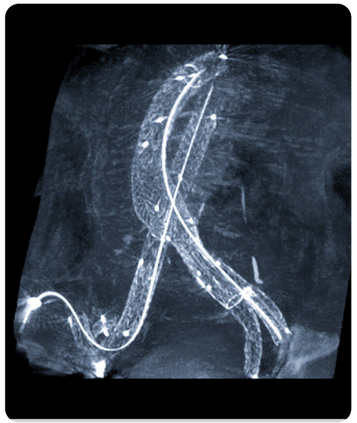
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Many thanks to our contributors:

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Cryoablation, an Electrophysiology (EP) Procedure

with OEC Elite CFD Motorized Cardiac C-arm

Interview with Dr. Sergiu-Nicolae Şipoş, Cardiologist and Interventional Rhythmologist, EP and Pacing Department, Institute for Cardiovascular Diseases, hospital CC Iliescu, Bucharest, Romania.

Interventional Rhythmology

Can you describe CC Iliescu National Institute for Cardiovascular Diseases and your ongoing projects?

'We operate as a public university hospital in Romania, recognized as a tertiary center, signifying our commitment to delivering the highest level of healthcare. As a result, we fall under the administration of the Ministry of Health. Our facility specializes in performing procedures that may be less accessible in other centers, such as aortic artery dissection, complex coronary percutaneous dilatations and certain types of electrophysiology (EP) procedures, and device implantations. Patients from across the country, particularly from the southern region of Romania, seek our services.

Our team consists of interventional cardiologists responsible for procedures like coronary angiography and stenting. Additionally, we have interventional rhythmologists who specialize in working with implantable devices, including pacemakers, as well as conducting electrophysiology and ablation procedures.
As cardiologist with expertize in interventional rhythmology, I am part of the EP and Pacing Department, which comprises four physicians dedicated to EP procedures, pacing, devices and electrophysiology. As a high-volume center for Romania, conducting approximately 1,200 procedures annually.

Regarding eletrophysiology (EP) procedures, we boast the highest procedural volume among all centers. We have two operating rooms. One is designed for implantable devices while the other is primarily used for EP procedures and complex devices. In that second room we have recently acquired an OEC Elite CFD mobile C-arm.'

What types of procedures are you performing?

'The procedures we conduct are categorized as either "simple" or "complex" in accordance with the Ministry of Health's criteria, which considers factors such as the volume of materials used and the complexity of the infrastructure required for the procedure.

For example, with simple devices like dual-chamber or single-chamber pacemakers, we rely solely on fluoroscopy.

However, for specific types of ablations in atrial fibrillation, ventricular tachycardias, atrial flutter for example, a 3D mapping system or a cryoablation console can also be necessary.

About half of the procedures we do are complex, and half are considered simple.'



In what ways OEC Elite CFD does assist your procedures?

'The OEC Elite CFD significantly improves image quality while requiring lower doses of radiation compared to our previous C-arm. The decision to choose the OEC Elite CFD was also influenced by its maneuverability. The motorized model, in particular, makes it easier for both our team and the staff to rotate and control the C-arm. The OEC Touch control panel simplifies the process with just one button push to achieve projections such as Left





Anterior Oblique (LAO) or Right Anterior Oblique (RAO).'

> *"OEC Elite CFD is very intuitive and very easy to use thanks to the motorization of the C-arm and the preset LAO and RAO positions."*
>
> Dr. Sergiu-Nicolae Şipoş

You mentioned earlier that cryoablation is a complex procedure. Can you talk about the benefits that OEC Elite CFD brings to that procedure?

'The imaging needs for balloon cryoablation are somehow different from the conventional radio frequency ablation.
For conventional RF ablation, you need 2D visualization of the position of the catheters and also for the transseptal puncture, just to see where you are in the area of the cardiac silhouette.

The imaging protocol for balloon cryoablation differs somewhat from simple procedures. It demands better image quality because we have to perform a pulmonary vein venography. So, it's not just about placing the catheters into the right cardiac chamber, but we also need to perform a good occlusion of the vein in order to treat it with a cryoballoon which comes deflated. At a certain point, we inflate this balloon, and we push it towards the ostium of the pulmonary veins to obtain total occlusion. To control it, we perform some contrast injection to check that we can't see the pulmonary vein and its branches.

The success of the procedure relies on achieving a thorough occlusion. Inadequate contact or contrast leakage around the balloon indicates poor occlusion, leading to a failed ablation. This is particularly critical in EP procedures, especially those targeting arrhythmogenic tissue around the ostium of the pulmonary vein. Such procedures demand high-quality images, precisely delivered by the OEC Elite CFD motorized Cardiac C-arm.

In our simple procedures, we always utilize low-dose fluoroscopy or a low frame rate. However, for complex procedures like cryoablation, we start with the low-dose mode and set the fluoroscopy at four pulses per second. If the image quality falls short, we incrementally adjust the dose by eliminating the low-dose mode and increasing the pulse rate. The motorized cardiac C-arm of the OEC Elite CFD simplifies this adjustment process.

It has been my instinctive approach to keep the radiation dose as low as possible. If the image quality is insufficient, we gradually escalate the dose, never commencing with medium or high doses. Most often, the image quality remains satisfactory with low-dose settings.'

> *"The quality of the image is pretty good with low dose settings."*
>
> Dr. Sergiu-Nicolae Şipoş







What other procedures are benefitting from your new OEC Elite CFD?

'There are other specific procedures we are doing with OEC Elite CFD that require very high-quality images. For instance, in the case of transvenous pacing, we employ specialized leads with small helices at their tips, which can be challenging to visualize. The OEC Elite CFD C-arm assists us in discerning the optimal positioning of the helices, crucial for ensuring a secure fixation between the lead and the myocardium.
The physiological pacing system approach, for instance, is a recent trend in pacing, that requires us to use delicate leads positioned in a very small area within the human heart. This precision is crucial to enable the lead to pace the normal conductive system accurately. Hence, our precision becomes paramount when working inside the patient's heart.
Conventional cardiac resynchronization therapy (CRT) is a rather complex procedure which requires us to place a third lead outside the heart in the coronary sinus veins situated on the epicardial surface of the heart. To achieve this, it is essential to have a good venography and a good visibility on the tiny guidewire, which has a diameter of 0.014.

As described earlier, performing a transseptal puncture to cross the interatrial septum is another moment that demands a very good image.'

"We need to have a good venography and a good visibility on the tiny guidewire that we use, the diameter of which is 0.014 '."

Dr. Sergiu-Nicolae Şipoş





In your opinion what are the most advantageous features of the OEC Elite CFD motorized Cardiac C-arm?

“The high-quality images achieved at lower doses is obviously very important.”

Dr. Sergiu-Nicolae Şipoş

‘The staff is aware that as they start the machine, they will select the ”low dose” mode just by pressing the ”low dose” button.

It is highly intuitive and user-friendly. The motorization of the OEC Elite CFD, along with preset positions, enhances its ease of use.’ ■



From left to right and back to front: Cristina Ungureanu (nurse), Claudia Nistor (resident Medical Doctor), Leonard Mandes (Medical Doctor), Sergiu Sipos (Medical Doctor), Laura Apreutesei (nurse), Violeta Mereuteanu (nurse), Florina Socol (nurse)



Dr. Sergiu-Nicolae Şipoş is a Cardiologist and Interventional Rhythmologist at the EP and Pacing Department of Institute for Cardiovascular Diseases, hospital CC Iliescu, Bucharest, Romania. Bucharest, Romania.

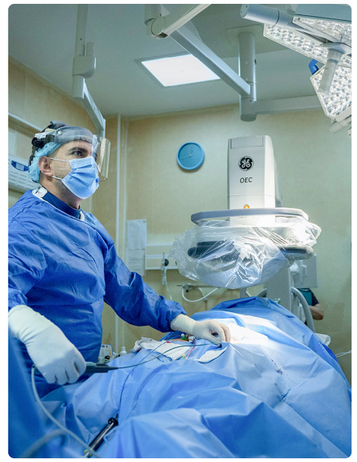
Dr. Şipoş has been a senior physician in cardiology since 2009 and an electrophysiologist for about ten years. He has a PhD in cardiology with a focus on cardiac arrhythmias and devices in heart failure.

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Balloon cryoablation of pulmonary veins (PV)

An electrophysiology (EP) procedure performed with OEC Elite CFD

Courtesy of Dr. Sergiu-Nicolae Şipoş, Cardiologist and Interventional Rhythmologist, EP and Pacing Department, Institute for Cardiovascular Diseases, hospital CC Iliescu, Bucharest, Romania.



Challenges

Balloon cryoablation of PV is an EP technique to achieve PV isolation (PVI) and restore a regular cardiac rhythm.
The cryoablation balloon is positioned and pushed forward over the ostium of the PV to treat until complete occlusion is obtained. After that step, cryoablation is initiated resulting in the cauterization of the PV's surroundings by freezing the cardiac cells.
One challenge of the procedure is to bring the cryoablation sheath from the right atrium (RA) to the left atrium (LA) of the heart via a transseptal puncture. Transseptal puncture might be a complex gesture that increases the need of fluoroscopic imaging.
Another challenge is to properly position the balloon over the vein. Confirmation is obtained through venograms requiring a good image quality in thick and moving anatomies.
The configuration and set up of OEC Elite CFD have been selected to address these challenges.

OEC Elite CFD configuration

The cathlab room is equipped with OEC Elite CFD in Cardiac configuration with the motorized drive C-arm and the 31 by 31 cm CMOS detector.
The motorized drive C-arm offers the possibility to preset and recall Left Anterior Oblique (LAO), Right Anterior Oblique (RAO) and cephalad-caudal angulations along the procedure from the Touch tablet (see Figure 1).
The deep Super C-arm of this configuration permits the installation of its mainframe at the extremity of the patient table to clear patient access while still allowing the detector to reach the cardiac area (see Figure 1).

The large size detector covers the anatomy of the heart which silhouette is used as a landmark by practitioners to guide their gestures during the procedure.

OEC Elite CFD set up

During the cryoablation procedure, the C-arm is positioned with 30-60° LAO angulation for the positioning of the balloon on the left PV (LPV), and 30-45° RAO angulation for the treatment of the right PV (RPV).
The imaging profile selected is Cardiac with the eNR correction to crisp the image of the tip of small catheters and guidewires (up to 0.014 inches of diameter) while in motion inside the beating cardiac chambers.
To manage radiation exposure the fluoroscopy mode is set to low dose and pulse mode (4 pulses per second).

Conclusion

OEC Elite CFD provides efficient support with precise fluoroscopic imaging guidance while managing radiation dose exposure.

Cryoablation of left pulmonary veins (LPV)

C-arm is angulated 45° LAO. Fluoroscopy mode is set to 4 pulses per second and low dose.

The guidewire is pushed from the RA to the LA through the fossa ovalis under fluoroscopic guidance. The full detector field of view is kept to observe the cardiac silhouette during the gesture (Figure 2). The transseptal dilatator and the sheath carrying the cryoablation balloon are advanced across the septum. The balloon is inflated and pushed forward to occlude the ostium of the PVs. Contrast media is injected to perform a venogram of the PV and its branches to control the proper occlusion of the ostium of the PV to treat by the balloon (Figure 3). The cryoablation balloon is moved inside the LA to modify its position (Figure 4) until the venogram confirms its proper positioning (Figure 5).

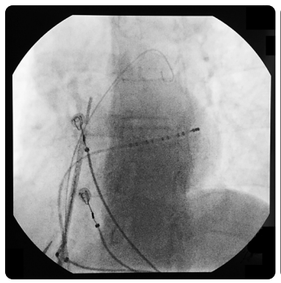


Figure 2

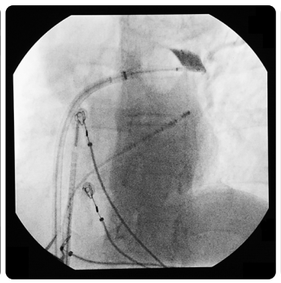


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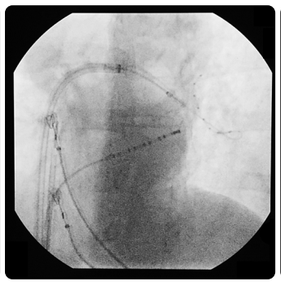


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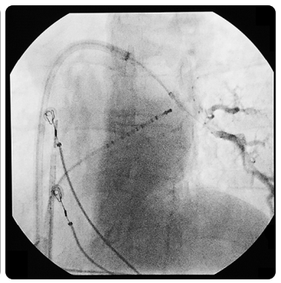


Figure 5



Figure 1: OEC Elite CFD C-arm is placed at the head of the patient. OEC Touch control panel shows the preset position menu.

Cryoablation of right pulmonary veins (RPV)

C-arm is angulated 35° RAO. Same steps are repeated to insure the proper positioning of the balloon over the RPV (Figure 6).

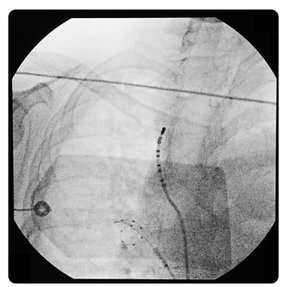


Figure 6

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Endovascular aortic repair (EVAR) with image fusion guidance

OEC Elite CFD paired with Cydar Maps image fusion system

Interview with Pr. Elixène Jean-Baptiste, vascular surgeon, Head of the department of surgery and vascular medicine, regional reference center of ‘SOS aorta’ project for PACA-Est region, at the Nice University Hospital, France.



Vascular surgery



The department of surgery and vascular medicine of Nice University Hospital deals with all arterial diseases, venous peripheral vascular diseases as well as vascular access for hemodialysis. The Nice University Hospital has a complete endovascular technical platform, a high-performance vascular functional exploration laboratory and a non-stop technical care service.

As the regional reference center for 'SOS aorta' project for PACA-EST region, that is creating a coordinated patient care pathway taking in charge acute aortic emergencies, Nice University Hospital has equipped a dedicated operating room (OR) with Cydar Maps (CYDAR Medical, Cambridge, United Kingdom) software. This cloud-based technology overlays the vascular mask from a preoperative three-dimensional computed tomography angiography (CTA) over intraoperative live fluoroscopy.

To be paired with this high-tech solution, the OEC Elite CFD motorized drive MD C-arm has been selected to provide imaging guidance of endovascular tools during endovascular aortic repair (EVAR) procedures.

Professor Jean-Baptiste, please tell us why you chose vascular surgery and what is your background?

'Since young, I have always wanted to become a surgeon. After my training in general surgery, I chose a fellowship in cardiovascular surgery. Then, vascular surgery attracted me the most, especially in relation to its possibilities for innovation in endovascular techniques. Vascular surgery is a specialty that can be labeled as 'young' even if it is currently reaching a phase of maturity. There are enormous opportunities for innovations in endovascular surgical techniques with many new tools for these techniques. Regrettably, this doesn't necessarily apply to some other surgical specialties which have already matured, ceased evolving, and are now losing prominence to the benefit of certain other medical specialties.

In France, we are fortunate that the vascular surgery community gives practitioners the opportunity to practice both endovascular surgical techniques as well as conventional surgical techniques also called 'open' surgery techniques.

So, after 5 years of training spent in general surgery, I pursued 2 years of specialization in vascular surgery. Then I completed a 3-year dual fellowship in vascular surgery at Nice University Hospital and at Lille University Hospital. At that time in Lille, we were doing endovascular procedures in an operating room equipped with one of the first vascular motorized mobile C-arms, OEC Elite 9900. This was before the era of hybrid rooms. After completing my Ph. D in Lille, I returned to Nice University Hospital working as a practitioner in vascular surgery. I am the head of the department of surgery and vascular medicine since 2015.'

What is your volume of procedures and what benefits does OEC Elite CFD bring to them?

'The department of vascular surgery deals with all arterial disease cases, venous peripheral vascular disease cases as well as cases of vascular access for hemodialysis. We perform around 2000 procedures per year and out of this volume of procedures, about 60 to 80% are executed by endovascular approach. Concerning aortic procedures specifically, we perform about 60 to 80 interventions per year of which 60% with endovascular approach, and 40% with conventional surgery.

Fluoroscopic imaging is an essential tool during endovascular surgical procedures. In the future, for some procedures we may use alternative tools such as image-guided echography, but so far, fluoroscopic imaging has allowed the development of endovascular techniques and the growth of the vascular surgery specialty. Both endovascular and fluoroscopic imaging techniques are continuously being developed together in parallel.





“When we started to look for a new C-arm for our department, I asked for three important things for my practice: a motorized C-arm, the ability to pilot the C-arm by myself from commands on the table side or a satellite control station, and good image quality during endovascular procedures.”

Pr. Elixène Jean-Baptiste

When we started to look for a new C-arm for our department, I asked for three important things for my practice: a motorized C-arm, the ability to pilot the C-arm by myself from commands on the table side or a satellite control station, and good image quality during endovascular procedures.

Hence, we opted for the OEC Elite CFD motorized C-arm with the vascular set-up software “Vascular MTS”. When operating the commands of the OEC Elite CFD C-arm, we alternate between the Remote User Interface (RUI) or the Touch Table Side cart depending on the procedure. For peripheral procedures (i.e. lower limbs recanalization procedures) I use the RUI for its compactness and its quick access to the main features.

“For peripheral procedures (i.e. lower limbs recanalization procedures) I use the RUI for its compactness and its quick access to the main features.”

Pr. Elixène Jean-Baptiste

“For endovascular aortic repair (EVAR) procedures, I often use the advanced features such as Live Zoom and the Digital Pen, easy to activate from the Touch Table Side.”

Pr. Elixène Jean-Baptiste

For EVAR we set up OEC Elite CFD in Vascular imaging profile, 8 pulses per second and in low dose mode. I use the Live Zoom to increase the size of the image without changing the dose of radiation. As the majority of our patients with these pathologies have renal failure as well, we dilute iodine contrast media with a saline solution to a concentration of 50% to avoid iodine shock. The good image quality of the angiography enables us to work in roadmap mode or with the Cydar Maps image fusion software.

As we often change the angle of the C-arm to obtain different images as we catheterize the collateral arteries of the aorta, we need to come back to these positions, and thus we often use the preset position functions to record Right or Left Anterior Orbital (RAO, LAO) angles as well as the cephalad caudal angles.

I can maneuver the C-arm angle from the Touch Table Side. This is a key advantage of having the OEC Elite CFD in our department because we have two operating rooms and only one radiologic technologist. On many occasions, I am comfortable to let our technician help in another operating room and operate the OEC Elite CFD C-Arm by myself.

What I truly appreciate about OEC Elite CFD, is it allows you to be autonomous!’



Vascular surgery



Can you explain to us the reason for pairing OEC Elite CFD with Cydar Maps?

'Image fusion tool is a step further in the evolution of endovascular techniques. This tool aims to reduce the number of X-ray images and the volume of iodine injected in the patient during EVAR procedures.

In simple words, Cydar Maps provides intraoperative imaging guidance by overlaying a preoperative vessel anatomy (or a 3D vascular mask) from the CTA of the patient onto intraoperative live fluoroscopy images. During the procedure, an artificial intelligence (AI) automatically corrects shifts between the 3D vascular mask and the patient's anatomy, when we change the position of the patient table or the angle of the OEC Elite CFD C-arm.

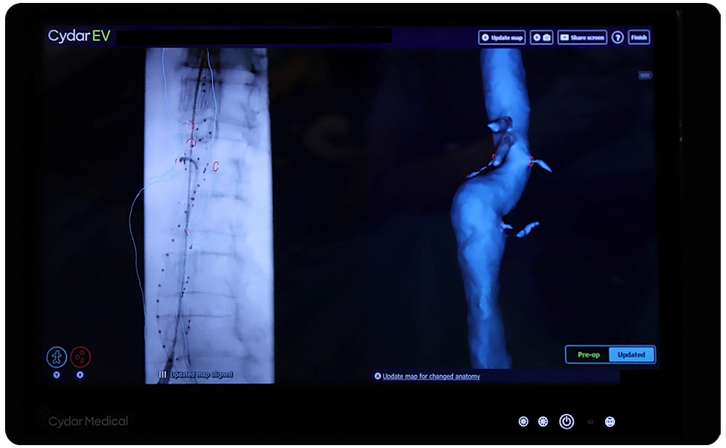


Figure 1: Cydar monitor showing on the left the overlay of the CTA 3D vascular mask onto OEC Elite CFD live image

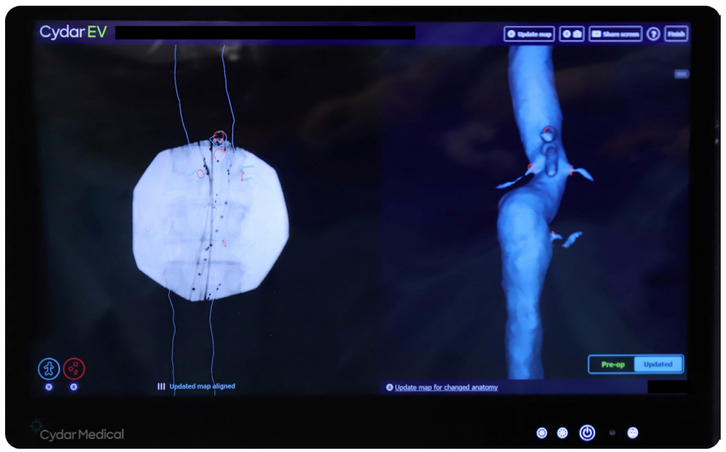


Figure 2: Cydar monitor showing on the left the overlay of the CTA 3D vascular mask onto OEC Elite CFD live image.

During the preparatory work before surgery, while working on the preoperative planning, I need to analyze the preoperative CTA scan. Cydar Maps helps me better reflect on the surgical strategy. I always explain to my interns that it is important to always have a flight plan before starting any endovascular procedure especially for complex procedures. The preparatory steps of the CTA image segmentation of the aorta and the step choice of the positioning of the rings on the mask, (a graphical representation of the ostia of collateral arteries) implement the surgical strategy into my thoughts. While defining the position of the ostium to be catheterized, I also decide the angle of the C-arm that matches the field of view I need for the catheterization of the considered artery. These choices are going to be important while executing the surgical gesture itself.

"What I truly appreciate about OEC Elite CFD, as it allows you to be autonomous!"

Pr. Elixène Jean-Baptiste

During the surgery, the guidance by the overlay of the 3D vascular mask over the live fluoroscopy, reduces the chances to struggle to find the right fluoroscopic view for the catheterization of an arterial bifurcation. In addition, Cydar Maps automatically repositions the 3D mask over the live fluoroscopy in synchronization of eventual changes of anatomy coverage of the fluoroscopy. No action from the surgeon is required. As we don't have engineers in the OR to support us, I really appreciate the additional autonomy I have during my surgery.

After the surgery, I can replay and quietly review with Cydar Maps the images of fluoroscopy with the 3D vascular mask of the different steps of a complex procedure and subsequently review how to overcome the potential difficulties encountered. It is a kind of rehearsal training tool for the surgeon.'



In a nutshell, how do you qualify the clinical value of pairing OEC Elite CFD with Cydar Maps?

'We have been using OEC Elite CFD paired with Cydar Maps for more than a year now, during all our aortic repair procedures, simple and complex. This solution of combined advanced imaging technologies supports us to manage the radiation dose and the volume of iodine injected in the patient.

The combination of Cydar Maps preoperative planning software and the preset positions of OEC Elite CFD enables us to save time in the execution of the procedure: we no longer spend time finding the correct angulation to catheterize the ostium. The procedure is simplified, and we are less exposed to X-ray radiation.

The image quality of the OEC Elite CFD paired with the Cydar Maps's 3D vascular mask with automatic repositioning reduces the number of iodine injections for patients with severe renal failure. We only need to perform one angiography at the beginning of the procedure to overlay the 3D vascular mask over the fluoroscopic image, and one angiography at the end of the procedure for the final control of the stent graft placement.

This technological solution brings autonomy, support, and confidence to the surgeon during his simple and complex endovascular procedures.'

> *"The combination of Cydar Maps preoperative planning software and the preset positions of OEC Elite CFD enables us to save time in the execution of the procedure."*
>
> Pr. Elixène Jean-Baptiste



Pr. Elixène Jean-Baptiste is a graduate vascular surgeon of Nice University of Medicine. He defended his Ph. D thesis in biomaterial research in 2012 after a dual fellowship at Nice University Hospital and Lille University Hospital. Currently based in Nice, he is at the head of the department of surgery and vascular medicine and the regional referent of 'SOS aorta' project for PACA-Est region, at the Nice University Hospital, France.

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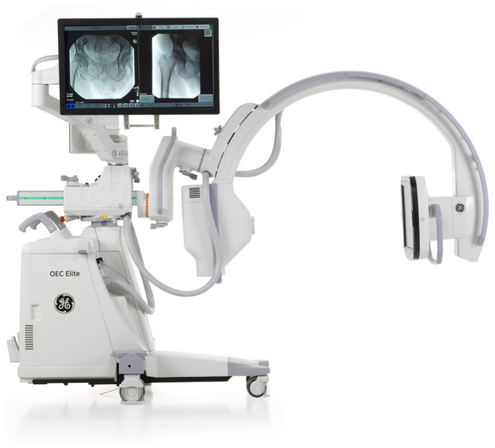
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Premium One-Piece Mobile C-arms

Exceptional simplicity

With all the imaging excellence OEC Elite CFD is renowned for, the one-piece configurations are lightweight, mobile C-arms that perform.



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Elevate your surgical imaging with an OEC Elite CFD premium one-piece C-arm.

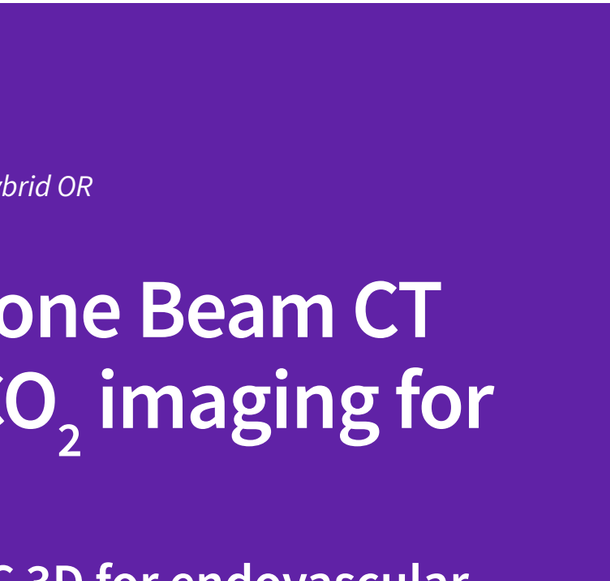
Availability of select models, configurations, and options varies by country. Please contact your local sales representative. JB32747XX

Advanced imaging tools in mobile Hybrid OR

Benefits of Cone Beam CT (CBCT) and CO_2 imaging for EVAR

Experience with OEC 3D for endovascular aortic repair (EVAR)

With the courtesy of Pr. Jonathan Sobocinski, vascular surgeon, Head of Department of Vascular and Endovascular Surgery, Dr. Maxime Lebaz and Dr. Zoe Ribreau, vascular surgeons, Aortic Center, Lille University Hospital, France



Pr. Sobocinski and GE HealthCare are exploring the benefits of CMOS flat panel technology in mobile C-arms for 2D fluoroscopic imaging and mobile Cone Beam CT (CBCT) imaging in endovascular surgery. Pr. Sobocinski shares his experience with OEC 3D in his ongoing clinical work.

The University Hospital of Lille is one of the largest university hospitals in France with 2500 beds. The department of vascular surgery hosts 50 beds and 3 operating rooms (ORs). Two of the OR's are equipped with mobile imaging systems, and one is equipped with a fixed system. The vascular department handles about 2000 arterial cases every year. One of the team's objectives is to apply the ALARA ("As Low As Reasonably Achievable") principles to reach the best compromise between radiation exposure, use of iodine contrast media, and surgery outcome.

In this article, Pr. Sobocinski, Dr. Ribreau and Dr. Lebaz describe two EVAR clinical cases with 2D fluoroscopic images and mobile CBCT scans performed with OEC 3D and in the second case their experience with CO_2 contrast media.

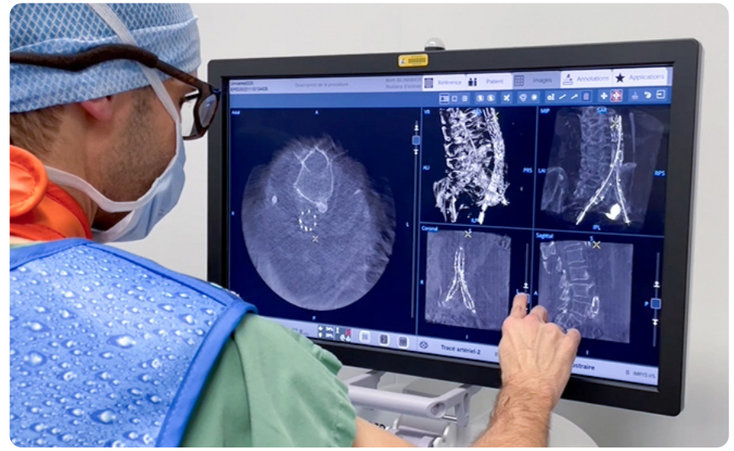


Figure 1: Pr. Sobocinski reviewing mobile CBCT scan images on OEC 3D workstation after the procedure.



Figure 2: Dr. Ribreau with OEC 3D

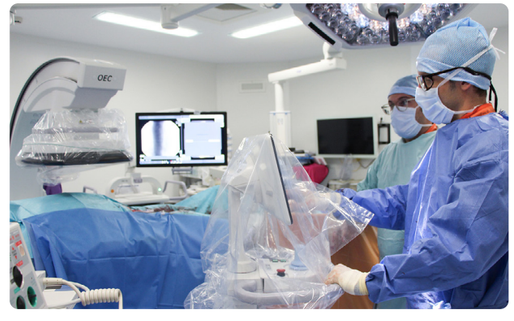


Figure 3: Pr. Sobocinski and Dr. Lebaz with OEC 3D Touch Table Side.

EVAR: Infrarenal stent graft with left iliac branched device

Presented by Dr. Maxime Lebaz, Dr. Zoe Ribreau and Pr. Jonathan Sobocinski, vascular surgeons, Aortic Center, University Hospital Lille, France.

Clinical Aspect

Over the last decade, endovascular aortic repair has become the preferred surgical technique to treat aneurysm and dissection. Patients' selection relies on strict anatomical criteria. The preoperative planning of the procedure includes careful analysis of the morphology of the aortic lesion and the ilio-femoral access. The technical feasibility and the stent graft sizing are then subsequently determined. The procedure is performed under fluoroscopy guidance, and the X-ray dose delivered throughout the procedure depends on the complexity of the navigation (calcification, tortuosity, diameter) and patients' morphotype.

When such procedures are performed with a fixed imaging system, routine CBCT scans are completed at the end of the procedure to ensure proper integrity of the stent graft and to depict any conflict on the devices implanted. These intraprocedural acquisitions secure the quality of the arterial reconstruction and have proven reduction in early and late reinterventions[1].

Technical Solution

OEC 3D is developed by GE HealthCare. OEC 3D is a mobile C-arm with 2D and 3D CBCT imaging using CMOS flat panel technology.

The OEC 3D C-arm provides a 19 cm x 19 cm x 19 cm high resolution 3D volume within 30 seconds of image acquisition, including up to 400 images with 3 different acquisition modes (Standard, High Definition and High Definition +). Integrated processing algorithms can smooth metal artifact (Metal Artifact Reduction) and reduce surrounding noise (enhanced Noise Reduction).

The user interface to plan and perform the 3D acquisition sweep (3D Setup Assistant) is easy to use: biplane lasers and a collision check step allow for a precise centering of the anatomy in the 3D volume. A 200° sweep of the C-arm collects 3D data in 30 seconds (3D data acquisition step). An additional 30 seconds of data reconstruction occur before display of volumetric images on the video monitor of the workstation.

The surgical table used is ImagiQ2™ (Stille AB, Solna Sweden).

The patient here is an 88 year-old with a large (80 mm) infrarenal abdominal aortic aneurysm extended to the left common iliac artery.

Case & Procedure

The treatment proposed was an endovascular exclusion of the aneurysm with an infrarenal stent graft in addition to a left iliac branched device to seal its left distal part within the external and the internal iliac arteries [Gore Excluder AAA Endoprosthesis, and Gore Excluder iliac branch endoprosthesis, W.L. Gore & Associates, Flagstaff, Arizona, USA].

The best projection to optimize the visualization of the origin of the lowest renal artery and iliac bifurcations were assessed from the preoperative computed tomography angiography (CTA).

The procedure was performed percutaneously under general anesthesia. The iliac branched device was first deployed associated with the bridging graft to ensure sealing in the internal iliac artery. Then, the positioning of the main bifurcated aortic body before deployment was checked with a short angiogram of 7 cc (cubic centimeters) of contrast media at the origin of the lowest renal artery. The subsequent usual steps of the procedure were achieved without any particular issue and iliac limb extensions were deployed in order to ensure optimal overlap between graft components on the left handside and sufficient application within the native right common iliac artery. A final 2D DSA (digital subtracted angiography) with 25 cc of contrast media confirmed aneurysmal exclusion, the renal and hypogastric arteries and stent graft patency.
A mobile CBCT scan with no injection was then completed.

The entire procedure lasted 100 minutes. The total fluoroscopy time of the procedure was 19 minutes, with a total Dose Area Product (DAP) of 44.445 Gy.cm² and the total amount of contrast injected was 40 cc [Xenetix® 300mg/dl (Guerbet, France)].

Volumetric images acquired with OEC 3D at the end of the procedure

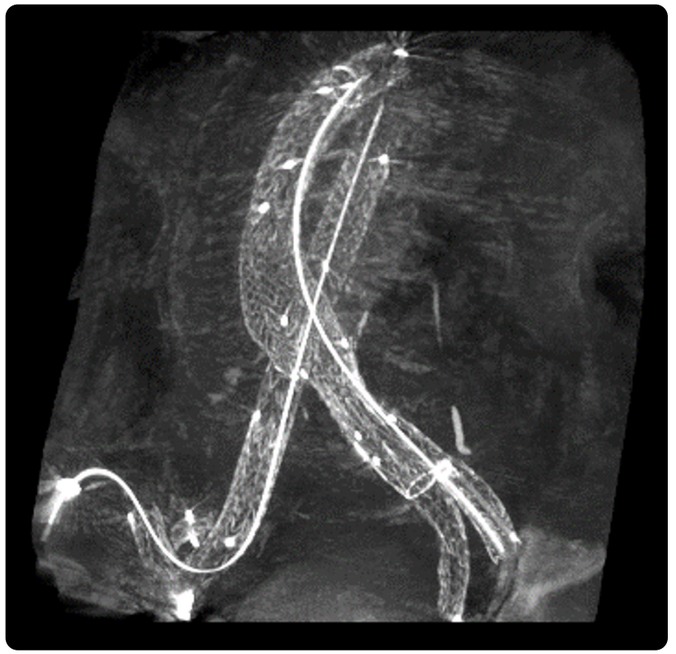


Figure 1: Maximum Intensity Projection (MIP) view of the case – data obtained with OEC 3D and displayed with the 3D volume viewer of AW plateform

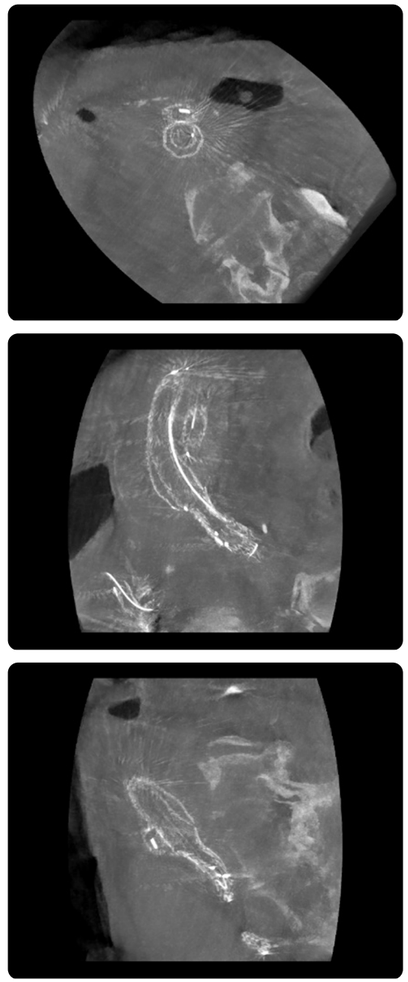


Figure 2: Maximum Intensity Projection (MIP) view of the case – data obtained with OEC 3D and displayed with the 3D volume viewer of AW plateform

1 [Lerisson E, Patterson BO, Hertault A, Klein C, Pontana F, Sediri I, Haulon S, Sobocinski J. J Vasc Surg. 2022;75:1021-1029.e2]

Specific featuring

The OEC 3D mobile CBCT C-arm is similar in terms of use and workflow to the OEC Elite CFD C-arm. The entire 2D fluoroscopic imaging procedure was completed in low dose and pulsed mode (8 pulses per second (pps)). At the beginning of the procedure the automatic storage of all fluoroscopic acquisitions was activated (dynamic recording): it reduces the need of DSA acquisitions along the procedure.

For the 3D acquisition, the '3D Setup Assistant' software guides the user through 4 steps: patient orientation and imaging mode selection (step 1), centering the anatomy in the 3D volume (step 2), collision check (step 3), and 3D acquisition (step 4).

After 30 seconds (duration of the 3D volume reconstruction) the volumetric images are displayed, and the Volume Viewer automatically opens with a suite of 3D imaging tools based on GE HealthCare AW image fabric.

The Volume Viewer displays 5 volumetric images on the monitor screens: cross sectional planes (axial, coronal, sagittal), volume rendering (VR) and maximum intensity projection (MIP).

The Volume Viewer's tools enable the user to choose the display mode options and several tools for viewing images of cross-sectional planes (such as Multi Oblique Mode, scrolling through slices, slice thickness adjustment, window level, zoom, measurement, annotation and image storing). For VR and MIP images it also allows users to rotate the image.

Conclusion

Introducing the possibility of completing an intra operative mobile CBCT scan with OEC 3D offers additional safety during EVAR.

Moreover, the mobile CBCT scan feature in OEC 3D is an easy-to-use tool with short learning curve for surgeons.

The 3D images obtained provide a reliable assistance for checking the quality of the endovascular exclusion and might alleviate the postoperative imaging follow-up requirements.



Figure 3: Dr. Lebaz using OEC 3D Touch Table Side from sterile field

Introducing CO_2 in the aorto-iliac region

Courtesy of Dr. Maxime Lebaz, Dr. Zoe Ribreau and Pr. Jonathan Sobocinski, Vascular surgery, Aorta Center, University Hospital Lille, France.

CO_2 is a gas 20 times more soluble in blood than oxygen and can be used in endovascular procedures as a contrast agent to help in navigation and assess vessel patency. CO_2 is eliminated by lungs and represent an alternative to iodized contrast agents in patients with renal dysfunction. CO_2 injections can be associated with potential side effects reported as cerebral gas embolism and general discomfort. There is no specific dose threshold as long as an appropriate interval is maintained between two injections and the injection should be in the vessels below the diaphragm. The injection is performed using a dedicated automatic injector. Since CO_2 is less dense than iodine contrast media (ICM), its X-ray absorption coefficient is lower, and requires a specific image processing in the different types of image acquisitions.

We present here the case of an octogenarian patient with known severe renal insufficiency with an estimated Glomerular Filtration Rate (eGFR) at 41 ml/min where was incidentally diagnosed a large aneurysm (10 cm in diameter) in his left common and internal iliac arteries. Considering the location of the aneurysm and the patient's medical condition, an endovascular exclusion guided with CO_2 as a contrast agent was performed.

The procedure included the embolization of the distal branches of the left hypogastric artery and the implantation of a bifurcated infrarenal stent graft with a left external iliac extension covering the origin of the hypogastric artery. The embolization enclosed the implantation of an Amplatzer AVP2 plug (Abbott) in one of the main distal branches of the hypogastric and was completed by pushable coils in other small branches [Concerto coils (Medtronic)]. Subsequently, after visualization of the lowest renal artery with a CO_2 aortography (volume and flowrate to be provided and administrated by the Angiodroid injector (Bologna, Italy)), a bifurcated infrarenal stent graft (RLT261412, Gore) was implanted. A final 2D angiography (25cc of ICM at a 15cc/sec) to assess the patency of the stent graft and potential perigraft leak was performed. A mobile CBCT scan using the high-definition mode of the OEC 3D was completed additionally and depicted constraints by the aorto iliac native bifurcation on both limbs of the stent graft requiring additional kissing stent (BeSmooth, Bentley).

The total procedure duration was 120 minutes, with 900 ml of CO_2 injected and a cumulated dose area product of 27,25 Gy.cm^2; the global amount of ICM injected was 25 cc.

The postoperative course was uneventful, and the eGFR at discharge was 48mL/min.

2D fluoroscopic imaging

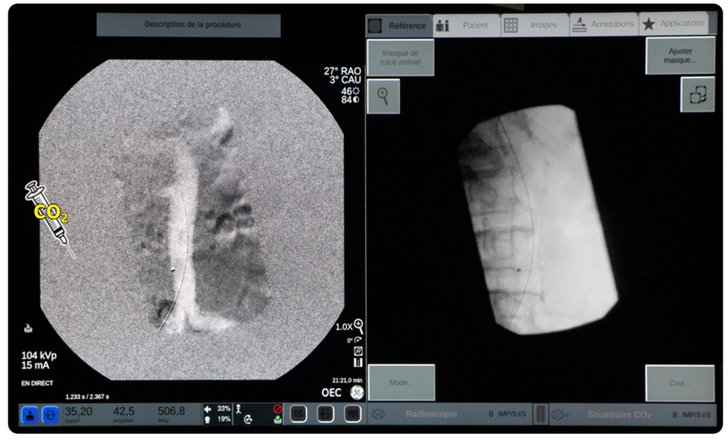


Figure 1: OEC 3D workstation monitors displaying initial DSA performed with CO_2 contrast agent

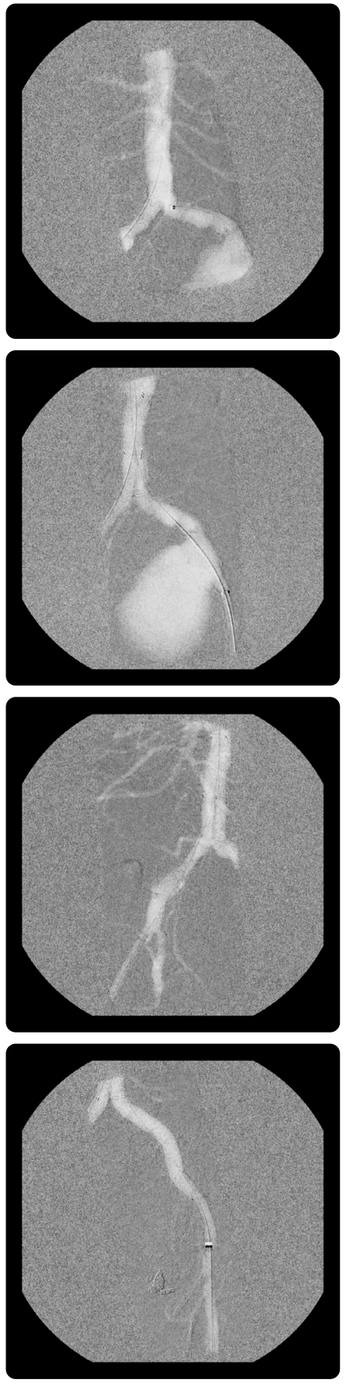


Figure 2: Peak opacification masks performed with CO_2 along the procedure

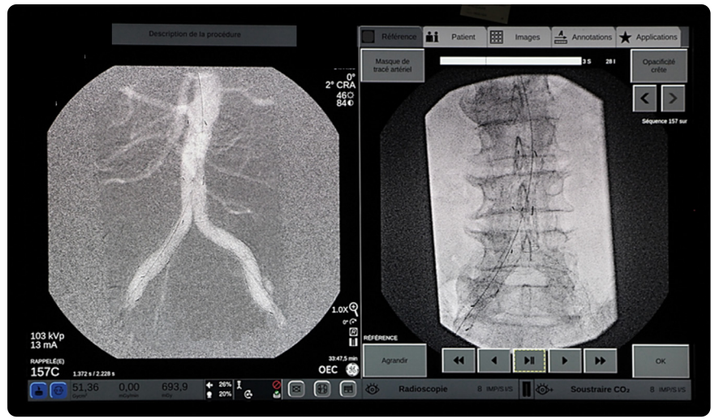


Figure 3: OEC 3D workstation monitors displaying final DSA performed with CO_2 contrast agent

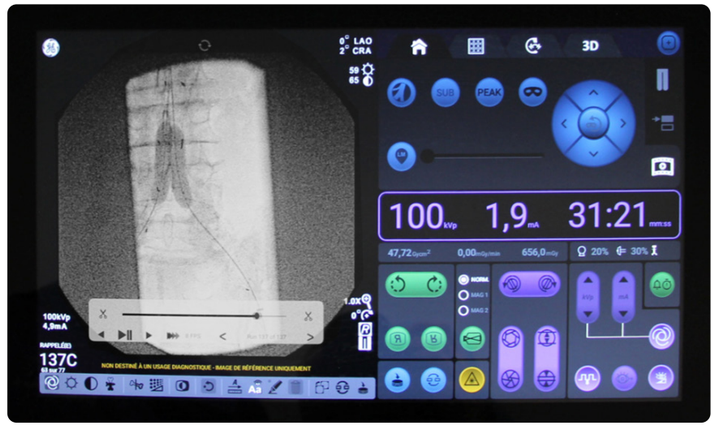


Figure 4: OEC 3D TouchView showing kissing balloon step of the procedure

Volumetric images acquired with OEC 3D at the end of the procedure

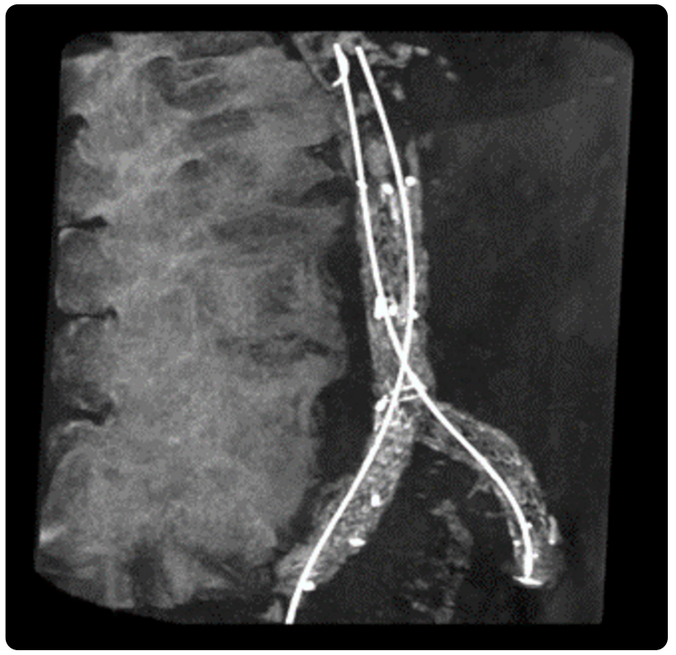


Figure 5: Maximum Intensity Projection (MIP) view of the case – data acquired with OEC 3D

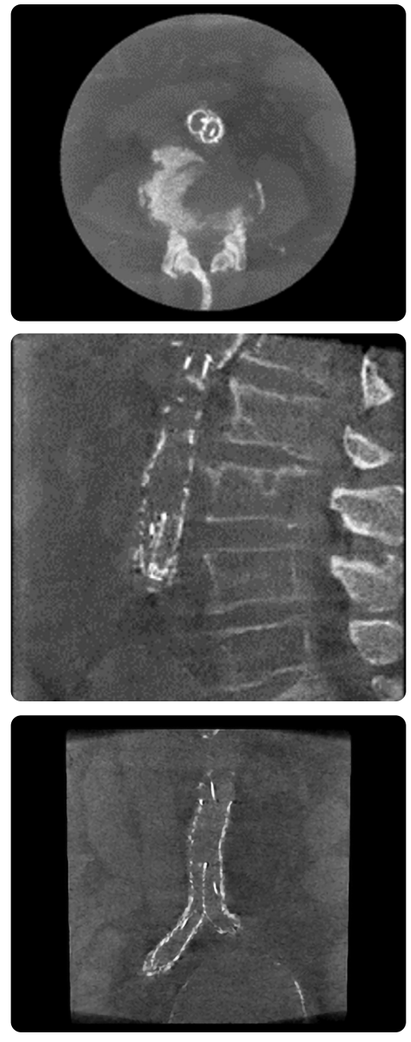


Figure 6: Multi oblique views of the case – data acquired with OEC 3D

Pr. Sobocinski is a paid consultant for GE HealthCare and was compensated for participation in this testimonial. The statements by Pr. Sobocinski described here are based on his own opinions and on results that were achieved in his unique setting. Since there is no "typical" hospital and many variables exist, i.e. case mix, there can be no guarantee that other customers will achieve the same results. OEC 3D is a mobile 3D/2D C-arm that provides intraprocedural mobile CBCT scan images and 2D fluoro images to enable visualization of anatomical structures during diagnostic, interventional, surgical, and minimally invasive surgery procedures such as endovascular procedures. JB28597XX

Vascular surgery



Intra-operative imaging for complex endovascular procedure: management of post-stenting complications

With OEC 3D

Interview with Dr. Nasser Alwehaibi, head of Vascular Surgery and Chief of the Operating Room at King Fahad Specialist Hospital, Buraydah, Kingdom of Saudi Arabia.

In the north-central part of Saudi Arabia, in the heart of the beautiful province of Al Qassim, the capital Buraydah, historical city renowned for its multicultural festivals, is fully committed to its public hospital King Fahad Specialist Hospital (KFSH).

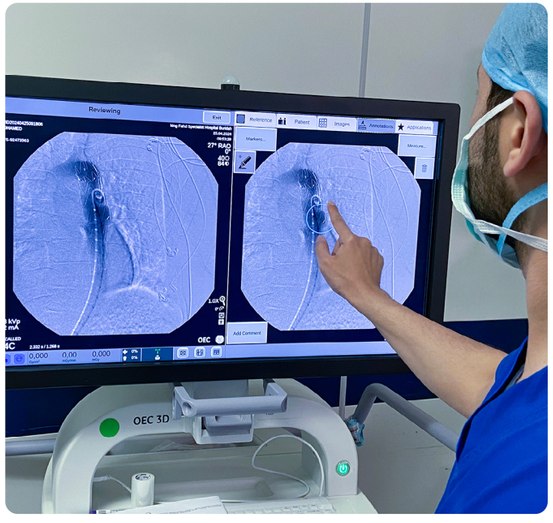
This 500 bed hospital serves a population of approximately two million people. It covers all medical specialties including surgery, medicine, oncology, obstetrics, and gynecology.

In a spirit of continuous improvement of patient care quality, the surgery department acquired the OEC 3D C-arm as a mobile Hybrid OR (HOR) solution for the vascular surgery team.

Dr. Alwehaibi, head of department of vascular surgery and chief of the operating room shares with us what considerations went into selecting OEC 3D for his routine work and complex vascular procedures.



In the mobile HOR, OEC 3D is positioned next to the patient and the anesthesia workstation is placed next to the patient's head. The main operator stands to the right of the patient.



Dr. Nasser Alwehaibi highlighting with Digital pen the endoleak in the aneurismal sac of the aorta.

Dr. Alwehaibi's main incentives to acquire OEC 3D are the advanced techniques and technology in the vascular surgery field. "I felt that with OEC 3D, we could keep up with these evolving endovascular techniques, which make it an exciting and dynamic specialty to pursue."

Dr. Alwehaibi, can you tell us more about your experience and imaging needs in your work?

"I am Dr. Nasser Alwehaibi, a vascular surgeon with around seven years of experience. I graduated from King Saud University, completed my Saudi Board of Vascular Surgery, and then did a three-year fellowship at King Saud University Hospital.

My professor at King Saud University Hospital, who specializes in arterial vascular procedures, was a significant mentor. His best advice was to always plan ahead of the procedure, or as I say now, "failure to plan is planning for failure".

> *"I felt that with OEC 3D, we could keep up with these evolving endovascular techniques, which make it an exciting and dynamic specialty to pursue."*
>
> Dr. Nasser Alwehaibi

I now work at KFSH as the head of the vascular department with a team of three vascular surgeons, five assistants, and around three residents each year. In the operating room, aside from the anesthesia team, we usually have the operator, an assistant, a scrub nurse, another OR nurse, and a radiology technician.

As we are a tertiary hospital, we use the OEC 3D C-arm for advanced endovascular arterial procedures. These include aorto-iliac, iliac, and lower limb procedures, for which 2D fluoroscopic imaging guidance and control, as well as 3D imaging, are necessary. For our aortic work with TEVAR (Thoracic Endovascular Aortic Repair) and EVAR (Endovascular Aneurysm Repair), in addition to advanced 2D fluoroscopic imaging, we consider that Cone Beam CT (CBCT) imaging mode is mandatory to evaluate post operative complications."

Dr. Alwehaibi, can you share an example of your work and how you overcome your challenges?

"First, I was looking for a Hybrid OR solution for both endovascular treatment and open surgeries. The most challenging aspect was the limited space I had to work in, so we decided to opt for a mobile 3D C-arm. After evaluation, we were convinced that OEC 3D was the best and only solution that suited me and covered all my needs.

One of the most difficult situations is arterial cannulation in EVAR (Endovascular Aneurysm Repair) cases, or when trying to cross a stenosis. This is why the image quality (IQ) needs to be precise so that small, short segment stenoses can be seen clearly, ensuring safe practice during endovascular treatment. I can achieve that thanks to the high IQ of the Roadmap mode, using the Digital Pen tool, and the preset positions functions.

> *"When I perform preoperative planning, I define all the working projection positions I need for peripheral arteries cannulating, and I save the corresponding C-arm positions to recall them as needed during the operation. Moreover, I am impressed by OEC 3D roadmap capabilities; the images are very precise, and the quality is excellent. This kind of roadmap increases the possibility of successfully crossing and cannulating the anatomy."*
>
> Dr. Nasser Alwehaibi

What are the fluoroscopy modes and functions that affect image quality?

"Usually, I use the 'Vascular' or 'General HD' imaging profiles in standard fluoroscopy, subtraction, and roadmap. In some cases, I mix the Live Zoom and magnification modes to obtain the best outcome from both functions."

> *"I foresee significant improvements in patient care due to increased financial and manpower support from the government. The trend in medicine is shifting towards subspecialties, minimally invasive procedures, and new technologies in imaging modalities such as OEC 3D, which will likely enhance our activities."*
>
> Dr. Nasser Alwehaibi



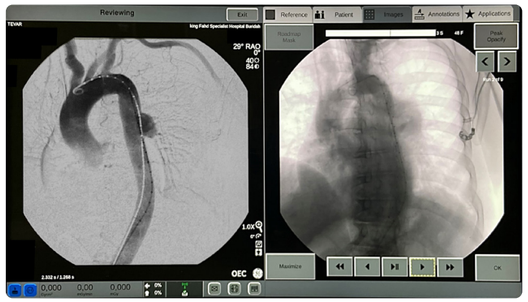
Dr. Nasser Alwehaibi is a Vascular and Endovascular Surgeon and the Head of the OR and Anesthesia Department at King Fahd Specialist Hospital in Buraydah, Saudi Arabia. He completed his MBBS at Qassim University in 2012 and earned the Saudi Board in General Surgery in 2018. Dr. Alwehaibi further specialized by completing a Fellowship in Vascular Surgery at King Saud University in 2022.

He is passionate about advancing minimally invasive procedures in vascular surgery and is dedicated to adopting and developing new techniques that enhance patient outcomes and recovery.

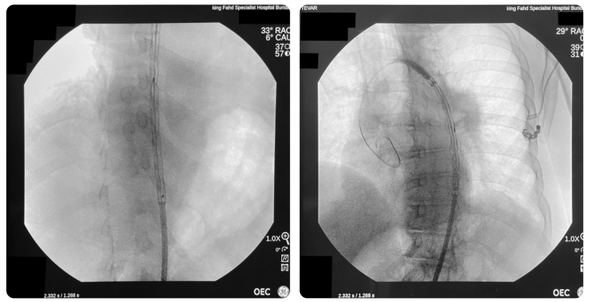
Clinical case

73-year-old man with a history of diabetes, hypertension, and ischemic heart disease, presented with severe back pain. Examination and imaging revealed a large, partially thrombosed descending aortic aneurysm. The patient underwent TEVAR, where a stent graft was deployed in the descending thoracic aorta, and the diagnostic angiogram showed a type III endoleak. An emergency reoperation was performed using another stent graft, successfully sealing the endoleak. The patient recovered well post-operation and was discharged with stable vitals.

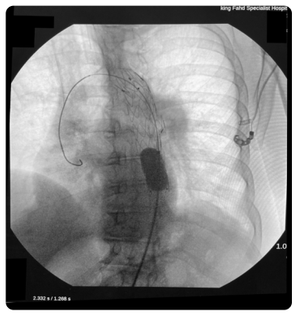
The main challenge was detecting and managing complications. The OEC 3D C-arm was positioned on the patient's right side with the anesthesia workstation placed at the patient's head. Vascular access has been performed via the left common femoral artery and a pigtail catheter has been used for endovascular navigation to reach the aortic arch. The device was deployed under fluoroscopic imaging guidance, using the Vascular imaging profile, roadmap, and subtraction imaging modes, with no magnification and no collimation.



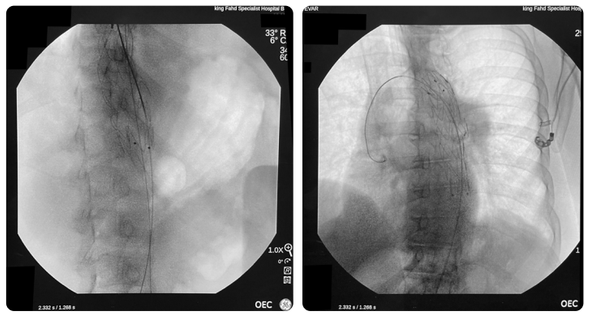
1. Digital Subtracted Angiography (left image), non-subtracted fluoroscopic image (right image): visualization of unruptured thoracic aortic aneurysm sac confirming pre-operative diagnostic.



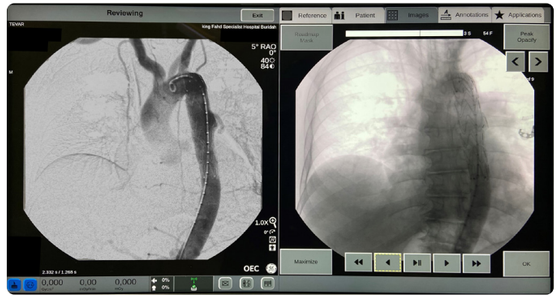
2. Dynamic fluoroscopic images, in Vascular imaging profile, during the placement in the aorta of the delivery sheath containing the thoracic stent graft. Identification of optimal placement of the stent graft vs. aneurismal sac.



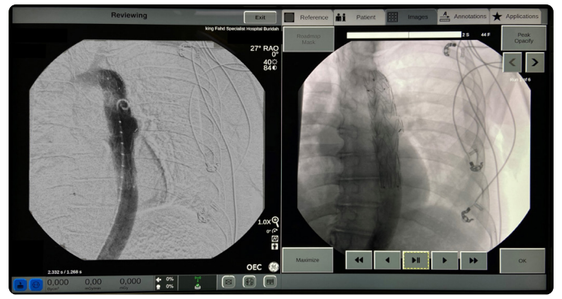
3. Dynamic fluoroscopic image showing the dilatation of the stent graft over the aorta lumen with an endoluminal balloon.



4. Dynamic fluoroscopic images, in Vascular imaging profile, during the control of the placement of the thoracic stent graft. Identification of a leakage defect of the stent towards aneurismal sac.



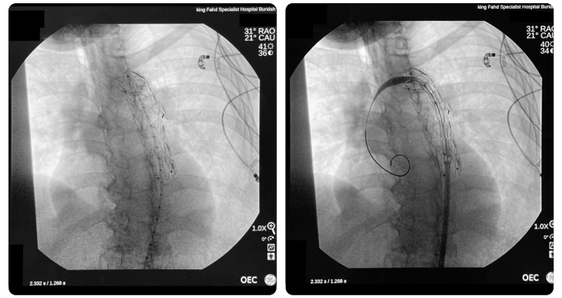
5. Digital Subtracted Angiography (left image), non-subtracted fluoroscopic image (right image): visualization of the endoleak into the aneurysmal – acquisition performed in antero posterior view



6. Digital Subtracted Angiography (left image), non-subtracted fluoroscopic image (right image): confirmation of the post stenting endoleak into the aneurysmal lumen – acquisition performed in right oblique view of about 30 degrees



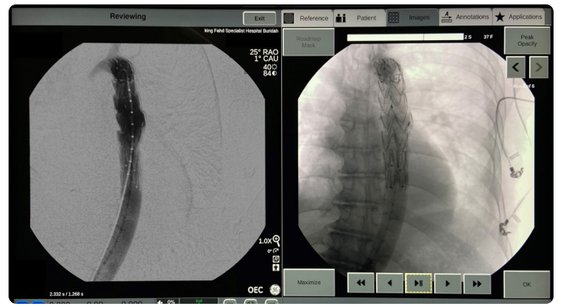
7. Digital Subtracted Angiography (left image), non-subtracted fluoroscopic image (right image): confirmation of the post stenting endoleak into the aneurysmal lumen – acquisition performed in antero posterior view



8. Dynamic fluoroscopic images during the placement of the second stent graft inside the first stent graft to correct the endoleak.



9. Digital Subtracted Angiography (left image), non-subtracted fluoroscopic image (right image): confirmation of the placement of the second stent graft showing exclusion of both the aneurysm and the endoleak from the aneurismal sac – acquisition performed in left oblique view of about 30 degrees and caudal angulation of 10 degrees.



10. Digital Subtracted Angiography (left image), non-subtracted fluoroscopic image (right image): final control of the procedure showing exclusion of the aneurysmal sac from the blood circulation – acquisition performed in right oblique view of 25 degrees.

The statements by GE HealthCare's customers described here are based on their own opinions and on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist, i.e. hospital size, case mix, etc.. there can be no guarantee that other customers will achieve the same results. JB32350XX

Interventional Radiology

Interventional Radiology procedures on advanced mobile catheterization laboratory

With OEC Elite CFD

Interview with Dr. Yasser Ben Cheikh, Head of Interventional Radiology, Clinique El Yosr International, Sousse, Tunisia.

Located south of Tunis, overlooking the Gulf of Hammamet in the Mediterranean Sea, the city of Sousse is the third largest municipality in Tunisia. In the heart of this city with neo-Moorish architectural style, the El Yosr International clinic was founded in 2001. Offering a wide range of healthcare services, the clinic is expanding thanks to the dedication of its practitioners, developing new specialties, particularly in interventional radiology.

Thus, after a long career at the Sahloul University Hospital in Sousse, Dr. Yasser Ben Cheikh joined the El Yosr International Clinic to develop the interventional radiology unit's care offerings. In search of an advanced mobile catheterization laboratory (cath lab) solution, Dr. Ben Cheikh opted for the OEC Elite CFD C-arm with motorized drive and remote control to equip his new cath lab room.

Dr. Yasser Ben Cheikh, MD and secretary of TIRA, the Tunisian Interventional Radiology Association, explains how OEC Elite CFD contributes to his daily work for Interventional Radiology procedures.



Dr. Ben Cheikh, what Interventional procedures do you perform in your mobile cath lab?

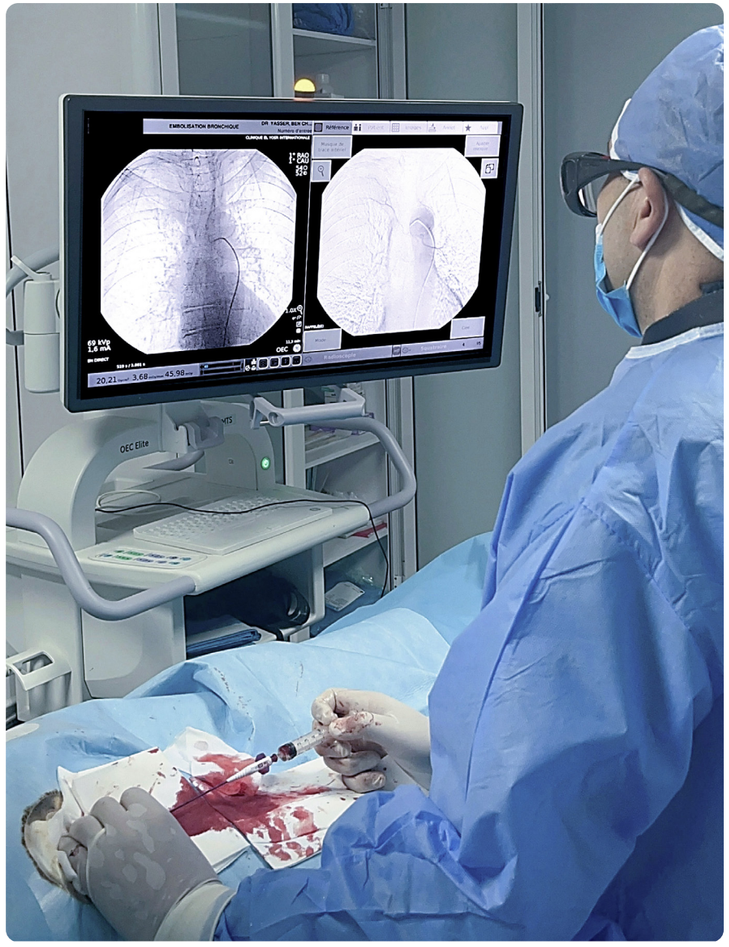
"The El Yosr International Clinic has a catheterization room equipped with a fixed imaging system, or fixed cath lab. As in many healthcare centers, its access is primarily reserved for interventional cardiologists who perform diagnostics and treatments for emergency procedures. So, when I joined the clinic, I wanted to have a catheterization room accessible at any time for my activities, right next to my consultation office.

This is why I opted for a mobile cath lab: a room equipped with a state-of-the-art mobile C-arm, allowing me to work peacefully without concerns regarding room availability. During my university career, I only worked in fixed cath labs. So, I had to adapt to my new mobile room and get used to the imaging output of the OEC Elite CFD C-arm. I started with simple procedures such as percutaneous access, biliary drainages, nephrostomies, and JJ stent placements. Then, I gradually increased the complexity of the procedures I performed in the mobile cath lab with peripheral endovascular acts and interventional procedures in the liver, such as chemoembolization, biliary drainages, and stent placements.

This progressive learning process has allowed me to perform procedures on the OEC Elite CFD mobile C-arm and today, I comfortably handle more complex procedures such as embolization of the portal system, hepatic venography, and embolization in various organs. For example, I quickly identify the Adamkiewicz artery and its different branches that nourish the spinal cord during bronchial embolization procedures. I can triage emergencies either in the mobile or the fixed cath labs without concerns, depending on the complexity of the procedure. It is a very good solution for hospitals that cannot afford to buy two fixed cath labs."

What are the advantages of OEC Elite CFD C-arm for your mobile cath lab?

"For endovascular procedures in lower limbs, particularly below the knee (BTK) procedures, the image quality of OEC Elite CFD is excellent. The mobile cath lab is very good; allowing procedures to be performed quickly and with flexibility in the setup of the equipment in the operating room.



The motorization of OEC Elite CFD, controlled by myself with the remote user interface (RUI), provides great comfort during the procedure.

> *"The 31 x 31 cm flat panel detector, the large 4K UHD display, and the motorization of the C-arm that can be controlled remotely from the sterile field, make OEC Elite CFD closer to the performance of a small catheterization room than that of a traditional operating room C-arm."*
>
> Dr. Yasser Ben Cheikh

With my RUI on the table's rail and the workstation's touch-screen, I am completely independent and can perform my entire procedure without needing to ask for help from the staff.

For more complex procedures, since I am familiar with my mobile equipment set up, I can adequately prepare my intervention plan. For example, for liver procedures, it is critical to know well the arterial and venous anatomy. Therefore, I study the patient's preoperative CT scan more carefully than if I was working in a fixed room and I memorize the patient's portal and arterial anatomy.



During the procedure, thanks to the use of the Live Zoom, I can navigate my catheter on the zoomed image of the anatomy while also viewing the entire non-zoomed anatomy on the second screen without increasing the dose to the patient. I can also automatically reposition the C-arm by recalling the preset oblique angles or position the C-arm in the desired viewing angle using the joystick of my RUI attached on the table's rail.

In procedures where I need to embolize aneurysms or tumors, I use the different imaging protocols of OEC Elite CFD to search and to identify anastomoses. These protocols allow me to repeat selective injections of contrast agent at different concentrations to identify the target that I need to navigate my tools towards and treat. Thanks to the RUI, I can easily switch to low-dose or pulsed fluoroscopy mode or choose between the General HD or Vascular imaging profile. Indeed, the General HD profile enhances the contours of the guidewires and allows for more precise navigation during ultra-selective catheterization steps, for example.

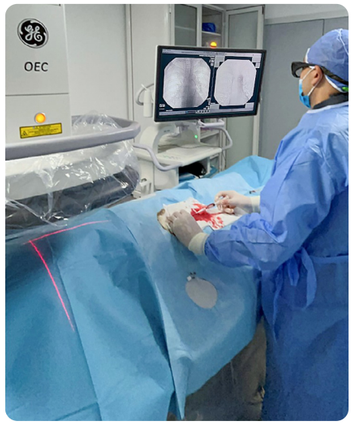
In the future, I would like to offer to my patients hemorrhoid vein embolization procedures. This is a technique that is currently being validated, which appeared 10 years ago and is increasingly recommended by scientific societies. I observe a significant increase in the number of patients treated with this technique. The procedure is performed in the anatomy of the pelvis, which is a complex anatomy in radiographic imaging due to its density and its volume. It requires different viewing angles and different fluoroscopy modes. I am confident that I can do these embolization procedures in my mobile cath lab.

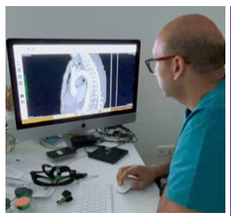
For other procedures such as chemoembolization of prostate arteries, it is necessary to perform a final control on volumetric images of the arteries via the acquisition of an injected CBCT. This is done to verify the result of the procedure due to variations in patient's anatomies. Therefore, I perform these procedures in the fixed room. However, for many other procedures, the mobile cath lab with OEC Elite CFD in motorized configuration is more than sufficient.

> *"With OEC Elite CFD, I have all the imaging tools to perform hemorrhoid vein, portal system and other types of embolization procedures."*
>
> Dr. Yasser Ben Cheikh

In summary, the image quality of OEC Elite CFD is truly very satisfying. My mobile cath lab is cost-effective because in Tunisia, the procedure's billing is the same regardless of the type of room in which it is performed."

> *"With my mobile cath lab equipped with OEC Elite CFD, I can carry out my activity independently and without worries."*
>
> Dr. Yasser Ben Cheikh





Dr. Yasser Ben Cheikh began his specialization in radiology in 2011 and quickly went into Interventional Radiology, completing various internships in Tunisia and in Nîmes, France. Upon returning to Tunisia in 2015, he joined the Sahloul University Hospital in Sousse in the Interventional Radiology department. After his internship, he took on the role of university hospital assistant and then Head of the Interventional Radiology Unit.

By performing and training many colleagues in endovascular techniques, hepatic embolizations, percutaneous interventions, and arteriography, he helped develop a reimbursement system for interventional radiology procedures in Tunisia.

In 2021, Dr. Ben Cheikh became head of the Interventional Radiology Unit at the El Yosr International Clinic in Sousse. He is the Secretary General of TIRA, the Tunisian Interventional Radiology Association.

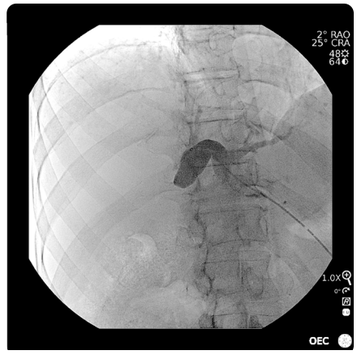
Complete portal embolization before right hepatectomy

Portal embolization is an interventional radiology procedure performed under general anesthesia. It is a specific embolization of the smallest capillaries of the portal system. It aims to deprive segments of the liver from their blood supply. This procedure is performed before hepatectomy, surgical resection of the liver's segments. The selective embolization procedure preserves the segments of the liver to remain and promote its compensatory hypertrophy. In the present case, the procedure consist of embolizing the right segments of the liver.

The procedure includes two main steps: a biliary drainage to prepare the patient for surgery and the embolization itself. Access to the portal vein is performed through a lateral percutaneous puncture under ultrasound guidance.

A portography, or image of the injection of contrast agent into the portal circulatory system, is performed. This injected fluoroscopic image allows for mapping the liver and identifying the vessels in the anatomical region of interest. It enables ultra-selective micro-catheterization of the liver vessels. The navigation of the endovascular tools in the liver is done in roadmap mode based on the previously performed angiography. This method allows selective and specific access to the different small branches of the portal system. An ultra-specific embolization of all the vessels and micro-vessels in the right part of the liver is then performed using biological glue. This glue helps to obstruct particularly fine vessels. Once all the vessels are obstructed, a final angiographic control is performed to ensure that the vessels are properly obturated and that blood flow no longer irrigates the part of the liver that will be removed.

Step 1: Biliary Drainage



1. Biliography confirming the puncture of the biliary tract (by percutaneous access).



2. Biliography of the navigation of the guidewire to the duodenal papilla.

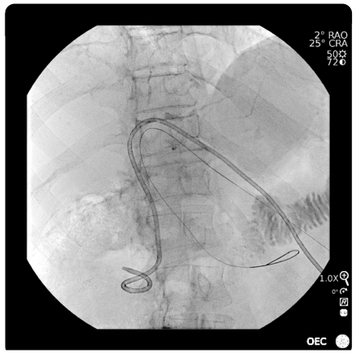


3. Biliography for the navigation of the guidewire to the duodenum.

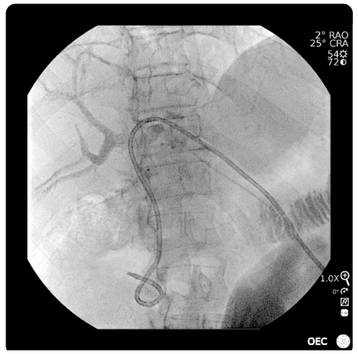


4. Biliography confirming the placement of the drain inside the duodenum.

Step 2: Embolization of the portal system



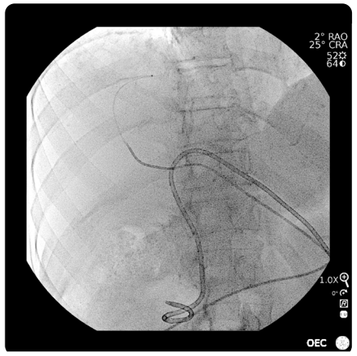
5. Fluoroscopy during portal system puncture.



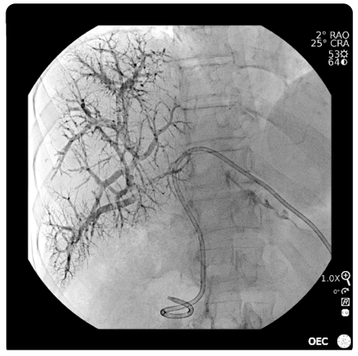
6. Angiography confirming the position of the catheter in liver.



7. Digital Subtracted Angiography of the portal system.



8. Angiography at the beginning of the ultra-selective embolization of the portal system.



9. Portography of final control showing obstruction of the portal system of the right part of the liver to be resected.

Dr. Ben Cheikh is a paid consultant for GE HealthCare and was compensated for participation in this testimonial. The statements described here are based on Dr. Ben Cheikh own opinions and on results that were achieved in his unique setting. Since there is no “typical” hospital and many variables exist, i.e. hospital size, case mix, etc.. there can be no guarantee that other customers will achieve the same results. JB32638XX



OEC 3D Lung Suite

Optional software package

Advanced 3D bronchoscopy imaging to enhance visualization

Augmented Fluoroscopy

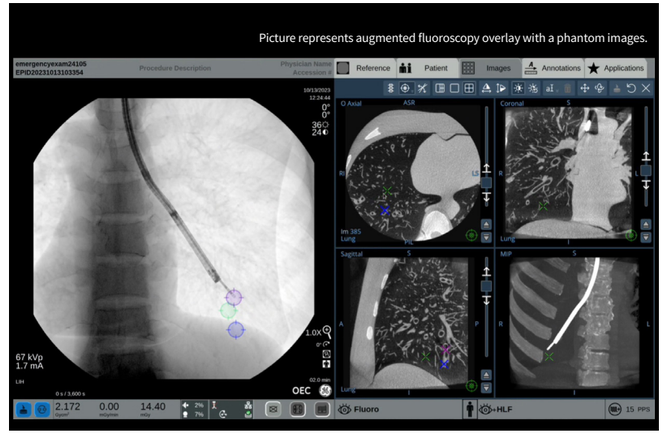
View 3D points of interest on live fluoroscopy.

Adjustable 3D scan

Accommodate patient or equipment positions.

OEC Open interface

Connect to a verified navigation or robotic system.



The images shown were taken for illustrative purposes only using a phantom and do not reflect the actual clinicl image quality.
Availability of select models, configurations, and options varies by country. Please contact your local sales representative. JB32748XX

GE HealthCare

OEC C-arms

OEC 3D



OEC Elite CFD

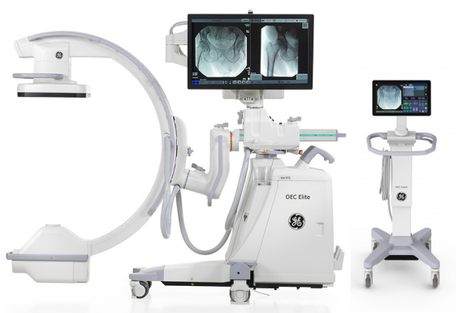
Super-C / Motorized Drive C-arm



Ergo C-arm



ECO*: Ergo C-arm One-piece



OEC MiniView MAX



OEC One CFD



OEC One ASD



OEC One



JB07964XE

*Availability of select models, configurations, and options varies by country. Please contact your local sales representative

GE HealthCare

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