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# Canon Medical's Infinix-i Biplane - A State-of-the-art investment for the University Hospital Geneva

Mrs. Florence Savoye, Prof. Dipen Shah

As part of its aim to enhance its capacities in the Interventional Cardiology electrophysiology research field in Europe, the University Hospital Geneva (HUG) has invested heavily in the exceptional new Infinix-i Biplane system from Canon Medical. The new system enables both simple and complex interventions to be carried out in clinical practice. With the complicated redesign and installation process almost complete, the hospital has already started to benefit from this state-of-the-art investment.

## **New Interventional Cardiology suite**

Headed by Mr. Herve Jacquemoud, the Biomedical Engineering Department at the HUG has five engineers and one assistant engineer. The team is dedicated to provide the highest possible standards of clinical interventional care, including emergency situations. In addition to this, they aim to achieve optimal efficiency and create a pleasant clinical environment to work in.

Through exceptional planning and coordination, the team have led the procurement of new equipment for many facilities, including three brand new cathlabs, which have recently been completely redesigned and refurbished over the last two years with state-of-the-art equipment from Canon

Medical. HUG is the first hospital in Switzerland to acquire the new Infinix-i Biplane system for one of these specialist rooms.

"Our mission was to create fantastic rooms for our clinical teams according to three principal objectives: Improved ergonomics and accessibility for patients; improved or maintained exceptional image quality; and decreased dose received by patients and health professionals," said Mrs. Florence Savoye, Biomedical Engineer at HUG.

"We first analyzed the current and future radiology and cardiology needs of the hospital in great depth towards meeting them in the design of new facilities, before we initiated the normal tender process for equipping them."



One of the Infinix-i Biplane's at the University Hospital Geneva.

### **Infinix-i Biplane**

"To improve ergonomics, the Canon Medical system that we chose featured ceiling-mounted arms for the Anesthetists and Cardio-Technicians, alongside video management and even ultrasound systems," Florence Savoye continued. "With some additional devices featured in this specific design, installation of the system required rigorous coordination between the technical teams of Canon Medical and the HUG, to enable accurate integration

between the systems and within the rooms and optimize flow."

Canon Medical has offered exceptional support to the HUG in the development of these complete and complex rooms, which is highly valued by the Hospital.

### **New clinical possibilities**

While the advanced new imaging system from Canon Medical brings brand new options in Interventional Radiology and

Interventional Cardiology, exceptional collaboration and team work of the clinical staff is still required to carry out these interventions. The clinical team at the Hospital include Professor Dipen Shah, who is Director of the Cardiac Electrophysiology Unit, and Professor Marco Roffi.

Prof. Shah explained how the Infinix-i Biplane is already enabling advances in Interventional Cardiology techniques, not just for the HUG itself, but also on a European level.



Prof. Dipen Shah.

*"The new system clearly improved our technological capacity, provides multiple viewing options and better head access, as well as significantly reducing radiation exposure."*



Mrs. Florence Savoye.

*“We chose the Infinix-i Biplane based upon the excellent ergonomics of the system and the organizational aspects, operation, training and support from Canon Medical.”*

“Dose reduction in all cardiovascular procedures is particularly important for medical personnel and patients. Being able to achieve the magnitude of dose reduction that is possible with the Infinix-i Biplane, while preserving, or even enhancing our imaging capabilities, is very gratifying,” explained Prof. Shah. “With the new system, we are able to perform simple and complex interventions, including advanced ablation techniques; diagnose and treat persistent and long-standing persistent atrial fibrillation (AF); atypical flutter; endocardial-epicardial ablation for ventricular tachycardia; complex atrial arrhythmias in adult congenital heart disease; and Premature Ventricular Contraction (PVC)-triggered idiopathic VF.”

“The new Biplane system has clearly improved our technological capacity, as reflected in the significantly improved ergonomics of the system. It provides multiple viewing options and better head access, as well as significantly reducing radiation exposure,” Prof. Shah continued. “Being able to position the lateral X-ray source on the opposite side has a beneficial impact on scatter radiation received by the operator. The real time dose tracking system also has clear benefits in reducing exposure for the patient.”

### **Creating new standards in Interventional Cardiology**

Several new protocols have been developed for use with the HUG’s new Infinix-i Biplane system. Many of these have been inspired by the European Union’s (EU’s) Sentinel Project.

With the Infinix-i Biplane installed, the HUG has also been able to provide expert input into this project, which was created to develop many new European standards in Interventional Cardiology and Interventional Radiology. These new standards include: image quality criteria including performance assessment parameters for flat panel detectors; the design and contents of patient and staff dosimetry databases; and optimization strategies.

In addition, the Sentinel team have considered efficacy and safety in Interventional Radiology population screening, as well as sensitive groups such as pediatrics; the ethics of medico-legal issues in Interventional Cardiology and Radiology; and self-referral

examinations. As well as setting standards for these issues, the Sentinel team have produced many training materials for clinical consultants on implementing these new protocols in clinical practice.

### **Extensive evaluations**

Using the new Canon Medical system, The HUG Biomedical Engineering team worked with the physician Marta Sans-Merce to evaluate three radioscopy modes for the following dose measurements: “Low Dose”, “Standard Dose” and “High Dose”. For each speciality, and in partnership with the clinical team, they identified activity-specific protocols, in particular the “fluoroscopy” or “acquisition” modes, which involve image frame rate choices.



Prof. Shah at work.



From left to right: Frédéric Gaspoz (Canon Medical Systems Switzerland), Roelof Hoekstra (Canon Medical Systems Switzerland), Prof. Shah (HUG), Prof. Roffi (HUG).

“For each mode, a frame rate from 3 to 30 images per second was selected. Contrast and spatial resolution were selected as evaluation criteria to compare the image quality of the different installations. The dose was evaluated by means of incident kerma rate measurement, in mGy/s, at the time of examination,” explained Florence Savoye. “We carried out more than 260 measurements to compare the Interventional Radiology systems as objectively as possible.

Using the 20\*20 Infinix-i Biplane FPD in low dose radioscopy mode, an average reduction of 75% was observed with improved image quality. When using the “acquisition” mode (at a frame rate of 15 and/or 30 images), the dose could be reduced by 77% with an image quality that was slightly worse, but decent enough and sufficient for examinations. These observations have also been seen in the other modes and at different image rates. With further tests performed together with Canon Medical, the Spot

Fluoro application showed a further dose reduction. Surprisingly, we noticed that several hospitals conducting similar tests during invitations to tender were interested in our results, which have also subsequently been published.”

“The Infinix-i Biplane is a flexible, state-of-the-art solution for our Interventional Cardiology needs,” said Prof. Shah. “We certainly hope to maintain and evolve our expertise with the edge provided by this impressive technology platform.”

“The dose linked to image quality was certainly an important factor in deciding for the Infinix-i Biplane in our final selection, but it was not the only factor,” said Mrs. Savoye. “We chose the best machine based upon the excellent ergonomics of the system and the organizational aspects, operation, training and support from Canon Medical. All of these scored points with our four main criteria, which are: technical, price, operation and clinical.

The Canon Medical team has been exceptional in understanding our specific requirements and in collaboration with HUG project. We will be equipping a third new room in late 2018 with an Infinix-i Sky+ system monoplane are counting on Canon Medical to help us complete this project, as well as they have done with the first two.” //



University Hospital Geneva (HUG), Switzerland.