

Perspective on fastest UK door to balloon center and Complex elective PCIs

@ Golden Jubilee National Hospital, Scotland

Glasgow is not only known for its famous “Glasgow Tower” which earned the Guinness World Record for its ability to be rotated 360 degrees in the presence of wind, but also, just 20 minutes away from this tower stands the Golden Jubilee National Hospital (GJNH) in which a dedicated team of physicians, nurses and radiographers are working night and day to ensure they deliver the best clinical care to patients suffering from heart disease. Spotlight on a reference center for the treatment of heart disease in Scotland.



of them were recently renewed to benefit from the latest innovations in PCI care, helping the department to treat more than 3000 PPCI per year. And, There are also several projects under development according to Dr. Eteiba, thanks to the Scottish government support.

“Government has allocated several million pounds for us to expand the hospital. Budget will be predominantly used for imaging, orthopedics and ophthalmology. It will enhance the profile of the hospital in these areas.”

Expanding the activity to structural heart disease

GJNH is currently the reference heart attack center in Scotland. Part of the growth plan is to expand the current activity to interventional structural heart treatments, *“We have already our MitraClip® programme, have recently started our TAVI service, and we aim to extend our programme to LAAC.”*

GJNH is expected to establish an advanced structural heart disease center in the next several months, which will include TAVI, mitral interventions and heart failure interventions. This will be all the more challenging since GJNH is already the Heart and Lung center for Scotland, performing heart transplants.

First, in relation to the large volume of activities at the Heart and Lung center, the number of beds at GJNH needs further expansion, *“Even though we have a limited number of beds, we are very innovative in terms of expanding our capacity by extending working hours, working weekends as well; of course, it cannot be done without*

investment in staff, both physicians, nursing colleagues, radiographers, physiological measurement technicians and also clinicians who are experts in interventional cardiology.”

Indeed, healthcare professionals within the hospital have access to the conference hotel directly connected to

the hospital, free of charge. It eases the life of staff when on duty, allowing them to reach the lab faster when PPCI patients come in the middle of the night. The second challenge for GJNH is to develop and grow the imaging staff and expertise, *“We need imaging consultants to support the*

structural heart disease programme, which includes MRI, CT, and advanced echocardiography. That’s our priority. In the immediate future we will be recruiting more staff as the volume is expanding.” □

1. <https://www.nhsgoldenjubilee.co.uk/news/press-releases-2014/uks-fastest-heart-attack-treatment/>
data source : National Cardiac Benchmarking Collaborative

A reference center in the UK

A national resource for Scotland, the Golden Jubilee National Hospital is part of the Golden Jubilee Foundation Family, which also includes the Golden Jubilee Innovation Center, Golden Jubilee Conference Hotel and the Golden Jubilee Research Institute.

The Golden Jubilee is home to regional and national heart and lung services, as well as a major center for orthopaedics.

Recently elected president of the Scottish Cardiac Society (SCS), Dr Hany Eteiba, an Interventional Cardiologist, Director of the Heart and Lung Center, and acting Medical Director for the Golden Jubilee Hospital, is proud to keep providing an excellent standard of care while having very ambitious projects for the expansion of the hospital.

“We are a flagship hospital and one of the largest Heart and Lung Centers in Europe. GJNH is the highest volume of interventional procedures in the UK.” Indeed, GJNH was the first Scottish hospital to perform a replacement heart valve transfemorally, thus avoiding the need for open heart surgery. It’s the only Scottish hospital to use a Ventricular assist device implant - also known as a mechanical heart. And last but not least, the PCI department can claim the UK’s fastest “Door to Balloon” time for patients requiring Primary Percutaneous Coronary Intervention (PPCI)¹.

Highly equipped center to get the most high-end, up-to-date technology for patient care

GJNH is equipped with 4 cathlabs to support patients coming for PPCI. Two

Dr. Eteiba tells us about his role in the Scottish Cardiac Society

Dr. Eteiba,
president of SCS



“This is a multiprofessional society, which includes all the cardiologists, cardiac surgeons and other professionals in cardiovascular Medicine in Scotland. My aim and mission is to put the society into an international role. We would like to partner with larger organizations like the European Society of Cardiology, the American College of Cardiology,

and we have already started communicating with these organizations. We also have partnerships with EuroPCR, and we are present at TCT. We would like to become the voice of cardiovascular medicine in Scotland and communicate internationally as a multiprofessional society.”

In addition to his role as President of SCS, Dr. Eteiba was recently appointed as the Vice President of the Royal College of Physicians and Surgeons of Glasgow. □

Dr. Watkins: "A lot of our patients have heavily calcified coronary disease and often it gets quite hard to see stents when they are implanted. This is one of the use cases where PCI ASSIST helps."

Inside the cathlab of GJNH

a day with Pr. Keith Oldroyd and Dr. Stuart Watkins

Overview of the Interventional Cardiology Department

The main procedure performed in the 4 interventional cathlabs of GJNH is the treatment of coronary artery disease (CAD). CAD is split into 3 different categories; 25% are STEMI patients, 45% non-STEMI, and the rest are elective interventions of patients with stable angina. As GJNH is an international center, there are also patients coming with congenital heart disease or advanced heart failure requiring, in some cases, cardiac transplant.

Management of Primary PCI at GJNH

Recipe to the fastest door to balloon time of the UK

The way GJNH manages patients coming for primary PCI is very efficient,

reflecting why GJNH can claim the UK's fastest door to balloon time¹. Indeed, GJNH serves a population of almost 2 million people for primary PCI. They perform around 750 PPCI cases per year.

Nobody will argue that time is of the essence with primary PCI. "You want the artery open as quickly as possible," says Dr Watkins. The secret of GJNH's claim as first in the UK in terms of door to balloon time (21 minutes according to the National Cardiac Benchmarking Collaborative) relies on several aspects;

"When we started primary PCI in 2008, we had to design a completely new service. For patients who present in the community, Scottish ambulance service brings them directly here and they can transmit the ECG to confirm the diagnosis if necessary," says Pr. Oldroyd.

First, physicians in the cathlab are able to access the patient's ECG very quickly, before arriving at the hospital.

The ECG is transferred digitally directly from the ambulance to the care unit. Therefore, they can decide remotely who needs to come for the procedure. There is no emergency department at the hospital to delay patients getting to the cathlab, so when patients arrive, they come straight to the cathlab. GJNH reports that time from the front door to the cathlab is 3-4 minutes.

Then, GJNH benefits from an on-call team who are able to stay onsite if they live a distance from the hospital. The Golden Jubilee Conference hotel is adjacent to the hospital allowing cathlab staff to be able to reach in the cathlab within a few minutes of leaving their rooms.

"Recently when we had bad weather, it became crucial and important that the staff was quickly available to deal with emergencies," says Pr. Oldroyd.

Dealing with complex PCI

Even though door to balloon is quick, some cases can take longer, especially for complex PCI. According to Dr. Watkins, complex PCIs happen more and more often as an ageing population is coming to the cathlab.

"The main challenge is that we've got an ageing population. With elderly patients you get more complex coronary disease which is often affecting multiple vessels or calcified

coronary disease which is more difficult to fix," says Dr. Watkins.

Moreover, patients who were previously referred to surgery are now eligible for PCI as techniques are improving. As a result, more complex cases can be performed percutaneously instead of going for open heart surgery.

"The PCI that we are doing nowadays is more complex than in previous years. The West of Scotland has a high burden of coronary disease, so in terms of volume, we did just under 3000 PCIs in total last year. We are the second largest center in the UK in terms of PCI volume," comments Pr. Oldroyd.

Innovative tools to treat complex PCI

GJNH's PCI department is fortunate to have high-end imaging tools available in the cathlab to provide optimal treatment options for complex PCI. Indeed, although coronary angiograms are the gold standard to detect coronary lesions, other imaging modalities such as IVUS or OCT are used routinely to help procedural planning. *"These imaging modalities give us a lot of information about the calcifications, the circumferential nature of calcification, and help us decide what we need to do upfront before trying to implant stents, and to make sure stents are well expanded,"* says Dr. Watkins. Coronary pressure wire can be used as well if there remains a debate about the significance of a coronary lesion.

However, habits have changed since the arrival of PCI ASSIST in the lab. According to Pr. Oldroyd, IVUS and OCT



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Golden Jubilee Live Case Conference

As the hospital is equipped to allow live case retransmission, GJNH is hosting an annual meeting focused on complex PCI. This year, the cases will be dedicated to high risk PCI (meaning for example, patients requiring circulatory support during the PCI, or patients needing ECMO...).

"At the opposite of other live cases in larger meetings, you can attend the whole case from beginning to end (4 entire cases should be done this year)" says Pr. Oldroyd.

It represents a major event for the cardiology department of GJNH.

"Live case courses put the operator under intense pressure. Last year, we did not have any visiting operators, all cases were done by our own interventional cardiologists, who felt very comfortable working in their own environment, and we succeeded to show every case from beginning to end" precis Pr. Oldroyd.

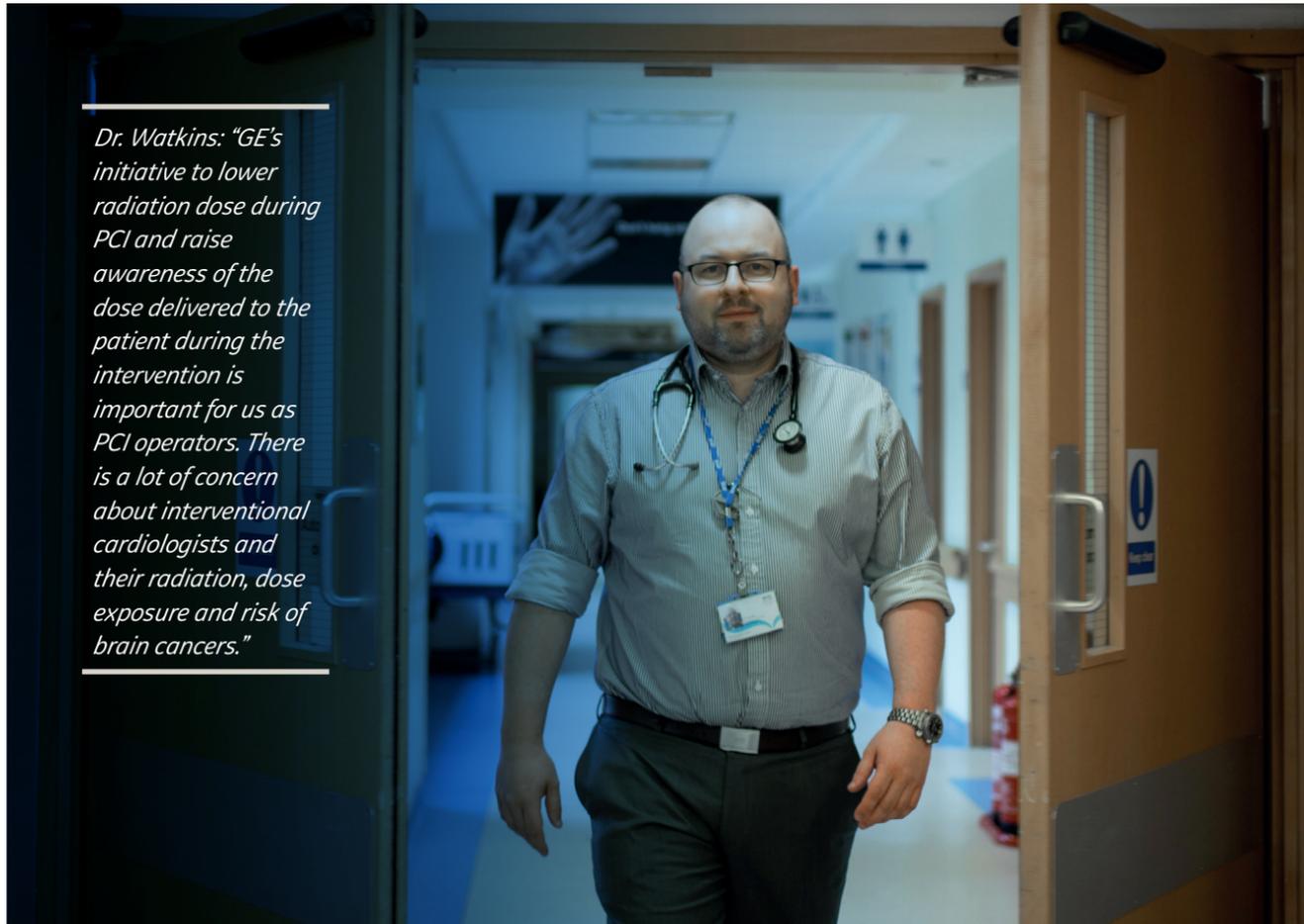
are more often used for procedure planning instead of insuring the adequate deployment of a stent; *"As PCI ASSIST works very well for stent deployment control, we mostly use IVUS/OCT for pre-procedure planning. For controversial cases, we start the case with IVUS/OCT to assess the degree of calcification, the vessel size, and to resolve some diagnostic ambiguities, then, the catheters are already open; it's quite natural to use it for post procedural assessment. For the remaining cases, PCI ASSIST is very useful."*

Dr. Watkins finds PCI ASSIST very helpful in many ways. It helps him see how well a stent is expanded to assist

with good procedural outcomes as under expanded stents carry risks of restenosis and stent thrombosis. *"It is helpful when you are deploying stents, to make sure the stents are properly expanded, without any fractures, and when you are post dilating stents, making sure that your non-compliant balloons are accurately within the stent margins and not outwith in order to avoid edge dissections."*

It's even more useful for his complex calcified cases where visualization of the stent within calcified arteries is sometimes challenging. *"A lot of our patients have heavily calcified coronary disease and often it gets quite hard to see stents when they are*

implanted. Even implanting platinum chromium stents in heavily calcified vessels can be very hard to see and obviously when we post dilate the stent we want to make sure that our non-compliant balloons are within the stent margins and certainly StentViz is excellent for that. We also use StentVesselViz as well, which is helpful to check that our non-compliant balloons are accurately placed. It's also really good for checking how well expanded the stents are, and making sure you don't have any stent fractures or other problems. We use it a lot here," says Dr. Watkins.



Dr. Watkins: "GE's initiative to lower radiation dose during PCI and raise awareness of the dose delivered to the patient during the intervention is important for us as PCI operators. There is a lot of concern about interventional cardiologists and their radiation, dose exposure and risk of brain cancers."

Future of PCI

Both Pr. Oldroyd & Dr. Watkins expect substantial improvements for PCI, whether it be from the device side or the imaging side. According to Pr. Oldroyd, the future of PCI relies on the development of multimodality imaging in the cathlab. He currently has access to IVUS catheters that can do near infrared spectroscopy, and sees great value in catheters ready for multimodality imaging as it helps him to understand the type of coronary disease patients have.

More than the imaging, the dose needed to perform PCI cases is also of

great interest to Dr. Watkins, "I think that GE initiative to lower radiation dose during PCI and raise awareness of the dose delivered to the patient during the intervention is important for us as PCI operators. There is a lot of concern regarding interventional cardiologists and lifetime radiation dose exposure."

Even though the site has recently been equipped with HD IVUS and OCT co-registration, Dr. Watkins also sees great development from the treatment side, especially for complex and very calcified cases; "In terms of treating calcified coronary disease I think intravascular lithotripsy (IVL) is going

to be a big addition to the ornament of dealing with calcified disease. We've already got scoring balloons, cutting balloons, open balloons, and rotational atherectomy, but I think the next device intravascular lithotripsy in the future may be the first line treatment of severe calcified coronary disease."

When it comes to stents, both physicians agree that a lot of improvements have been made since the introduction of BMS. Despite the results provided by the recent ABSORB III Trial, they are convinced that BVS is not dead.

"As far as PCI is concerned, there has

been a major disappointment in the past few years with bio resorbable scaffolds. They have proven to be no better than conventional metallic stents and possibly harmful in the long term. I personally don't believe that it's the end of the story. I think we will see a new wave of re-engineered bio resorbable vascular scaffold, improved versus the first-generation stents, and we will move towards using devices that in the long term don't leave a permanent metal cage in the artery," says Pr. Oldroyd.

Opening a structural activity

Finally, GJNH has recently opened a TAVI programme. It has been a long road since 2012, when TAVI activity started in Scotland. The main reasons were cost restrictions and government decision to allow no more than one TAVI center for the country,

Demand has increased dramatically since 2012, and the single center in Edinburgh that was providing TAVI for Scotland had to do more than 200 cases a year, which is a lot for one site to deliver.

However, according to Pr. Oldroyd, being amongst the last to start TAVI can also be an advantage.

"First TAVI done in 2002, the first one in the UK was 2007 so we are entering in

the TAVI arena at a very late stage. The advantage of that is the technology has become quite mature, and the clinical results are excellent, the length of stay is much shorter, most cases are done transfemorally under local anesthesia."

The closest medical center performing TAVI is in Edinburgh, with a volume exceeding 200 implants per year. GJNH aims to perform 150 cases in the first year, and expand the activity in the following years".

Linking MRI and invasive coronary physiological parameters

Pr. Oldroyd is proud to lead research activities in the cardiology department. Most of his work relates to finding a link between invasive coronary physiological parameters and cardiac MRI imaging.

"During STEMI, we measure (if possible) myocardial blood flow, then we use the MRI (after stenting) to determine the final size of the myocardial fracture. If we can tie these two things together, we can use the blood flow measurement in the cathlab to target new treatments."

And part of the results they published may have changed practice.

"If you have a patient after primary PCI who has very low IMR (index of microcirculatory resistance), we know, from our MRI study, that this patient is going to have a large infarction and a high probability of developing heart failure. Those are the patients on which new therapies can be targeted to try and reduce infarct size. It's a means of trying to select the very high-risk population who potentially will benefit from new treatments."

IGS 5 Intended use: Medical device, X-ray equipment for diagnostic, interventional and hybrid surgical procedures. Class/Notified Body: IIb/ CE 0459. Manufacturer: GE MEDICAL SYSTEMS SCS Always refer to the complete User's manual before use and carefully read all instructions to ensure the good use of your medical device. Last revision: 2014-11-24

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1. <https://www.nhsgoldenjubilee.co.uk/news/press-releases-2014/uks-fastest-heart-attack-treatment/> data source : National Cardiac Benchmarking Collaborative JB57196FR