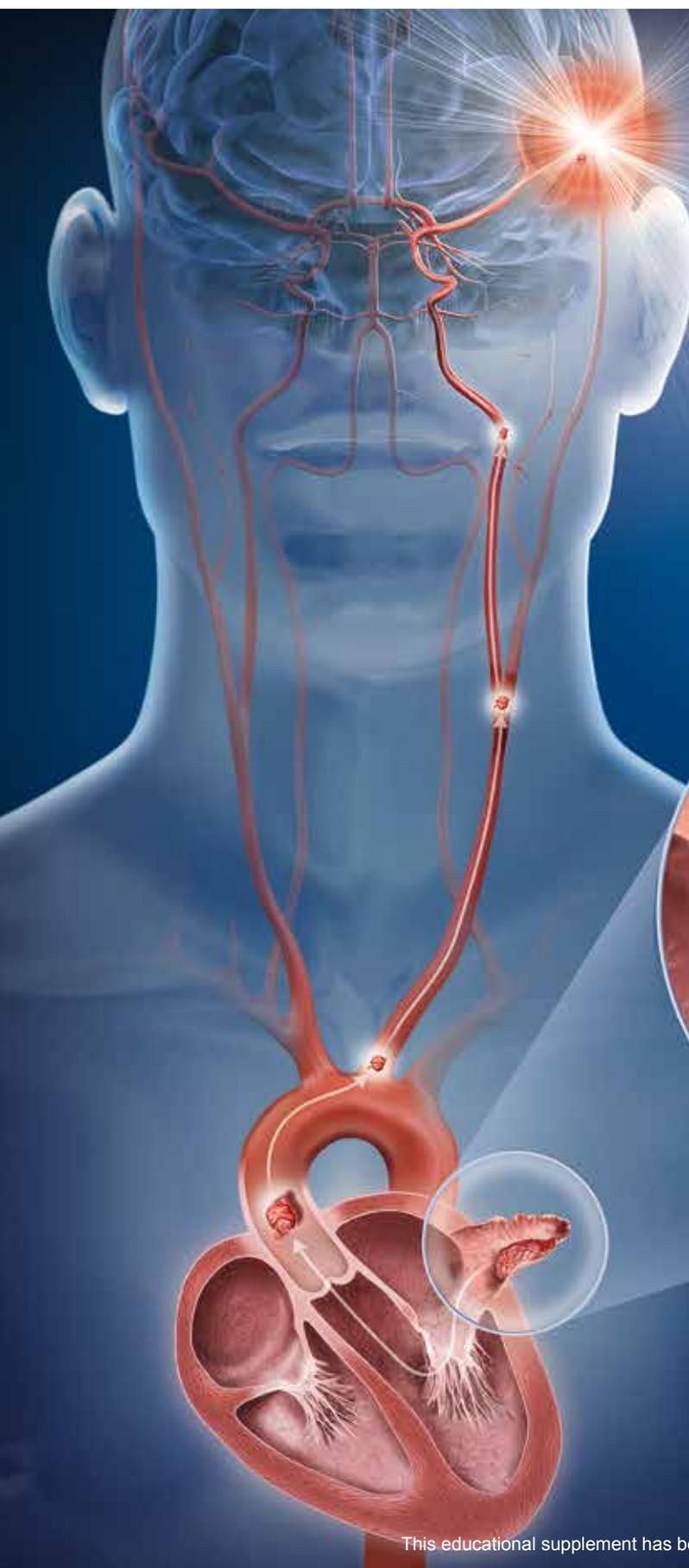
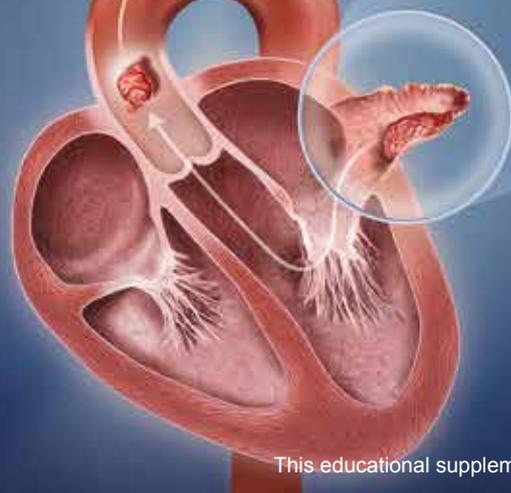


Cardiac Rhythm News

EDUCATIONAL SUPPLEMENT



LAA closure
for stroke
prophylaxis in
atrial fibrillation



Delivering on
patient-focused
innovation

This educational supplement has been sponsored by Boston Scientific

In this supplement:

- 2 Is oral anticoagulation the right treatment for stroke prevention in all atrial fibrillation patients?
- 4 LAA closure with the WATCHMAN™ device: A clinically proven treatment
- 5 The WATCHMAN™ device in clinical practice
- 7 Exploring the benefits of LAA closure as a minimally invasive procedure
- 7 Selecting the right patient for percutaneous LAA closure with WATCHMAN™
- 8 “I am not worried about having a stroke now that I have had a WATCHMAN™ fitted”

Is oral anticoagulation the right treatment for stroke prevention in all atrial fibrillation patients?

Internationally renowned expert in atrial fibrillation John Camm (St George’s University of London, UK) discusses current anticoagulation use for stroke prevention in patients with atrial fibrillation and shares his views regarding interventional treatment with left atrial appendage closure.

According to current data, which atrial fibrillation patients benefit the most from oral anticoagulation treatment?

Those patients who are at increased risk for a stroke. Systemic embolism is also a problem, which is helped by anticoagulation in patients with atrial fibrillation, but these events are not as common as strokes.

We can identify patients at risk for stroke by using one of several possible scoring schemes. Essentially, they have to have a risk of at least 0.9% per annum of an ischaemic event in order to justify the use of a non-vitamin K oral anticoagulant (NOAC) and a risk of about 1.7% events per year in order to justify the use of a vitamin K antagonist (VKA) such as warfarin. This difference is because more bleeding events—particularly intracerebral—occur with warfarin than with NOACs.

If we use the scoring schemes, they take into account a series of clinical risk factors, particularly age and a previous history of transient ischaemic attack or stroke. It is also possible to find patients at risk of stroke with hypertension, heart

failure, vascular disease, diabetes and renal function. In addition, we know that various biomarkers such as troponin and NT-proBNP are also important for stroke risk assessment.

When prescribing anticoagulation treatment, it is also important to analyse bleeding risks. If bleeding risks are very high we should think carefully whether we can reduce the risk by modifying any of these risk factors. For example, we could reduce blood pressure and, therefore, reduce the likelihood of bleeding. We can also make sure that the patient is not taking other drugs that will encourage bleeding such as antiplatelet drugs. Reduction of alcohol intake is also important to improve bleeding risk scores. These are a few things that we can do to reduce the risk and optimise the environment for the use of anticoagulation therapy.

In the overall atrial fibrillation population, what is the percentage of people who are at risk of stroke?

We know that the risk of stroke is five



John Camm

times more common in patients who have atrial fibrillation. If a patient has mitral valve disease as well as atrial fibrillation, we know that their risk of stroke is about 17 to 20 times greater than a person without these conditions. It is difficult to give an absolute percentage because it all depends on the level of risk that you think is appropriate to justify treatment. But if the risk is around 1% per annum, about 85% or more of the patients with atrial fibrillation could be vulnerable to stroke and have some advantage from anticoagulation. Many believe that the

first thing is to consider anticoagulation and then carefully consider if there are any patients who should not be anticoagulated. Patients who may not need anticoagulation are essentially young people with no underlying cardiovascular or renal disease.

To what degree have the non-vitamin K oral anticoagulants overcome the limitations of warfarin?

The limitations of warfarin are mostly related to its drug-to-drug interactions and food-to-drug interactions. Because of these interactions, the lifestyle for patients may change—they have a restrictive diet, for example. Additionally, the patient has to have regular international normalised ratio (INR) tests to work out his/her anticoagulation levels. These regular tests require the patient to go often to the hospital, perhaps travelling many miles from home, and this is another interference with lifestyle that tends to lead to a reduced quality of life.

The NOACs have overcome some of the limitations with warfarin because they do not have food-to-drug interactions and they have relatively few drug-to-drug interactions. NOACs were designed specifically to be given to patients without the need for monitoring. Some say we ought to be thinking of monitoring patients taking NOACs because there are some drug-to-drug interactions, but most do not believe that this is necessary.

If we look at phase 3 of the major clinical trials in the field, we can conclude that patients should be better off taking NOACs instead of warfarin, as patients are less likely (50% reduction) of having an intracerebral bleed, which is the most serious complication of treatment with warfarin and for that matter any anticoagulant. In addition, the total number of strokes or systemic emboli with some of the NOACs seem to be less than with warfarin. Finally, if we look at all our experience with NOACs, people live longer if they are taking them and have a greater net clinical benefit. If you add together all the really serious events—death, life threatening bleeding, intracerebral haemorrhage and disabling stroke—treatment with NOACs beats treatment with VKAs. Additionally, there is no need for monitoring so the quality of life increases.

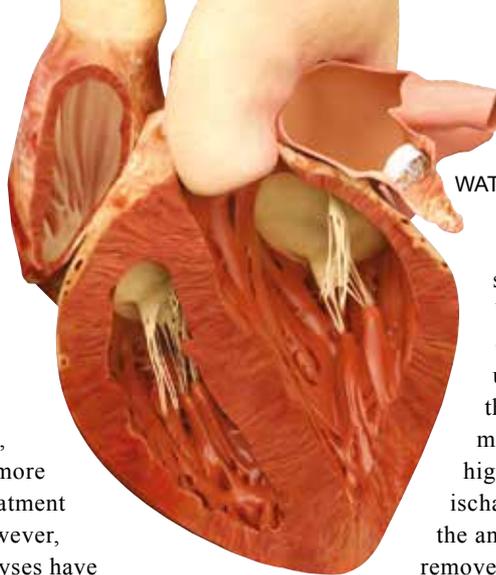
What limitations exist for the widespread use of NOACs?

There are various limitations. Firstly, NOACs are not yet approved in every country so that process is still ongoing. Secondly, NOAC therapy is more expensive than treatment with warfarin. However, cost-effective analyses have shown that treatment with NOACs reduces healthcare expenditure in the long-term compared with VKA treatment. However, the impact of very high charges to prescribe a NOAC is currently not immediately offset by long-term savings; therefore, some healthcare systems find it difficult to immediately accept the increased cost of NOAC therapy, so for that reason many restrictions have been put in place in various countries to limit the use of NOAC therapy.

Another interesting reason is that some patients much prefer to have their INR measured and to know that they have been accurately treated, similarly, some doctors have this preference. Nevertheless, things have improved. If we look at registries that have been tracking the use of NOAC therapy we can see that from 2010, at a global level, there was about 4% use of NOAC therapy in people who were anticoagulated and were at risk of thromboembolism, and in 2015 the percentage went up to 37%. The total number of anticoagulated patients has increased from 51% to 71%.

What is your view regarding alternative methods such as left atrial appendage (LAA) closure for stroke prevention in atrial fibrillation patients?

Anticoagulation is not appropriate in patients who are at risk of recurrent



WATCHMAN™ *in situ*

major bleeding—specially intracranial bleeding—because of anticoagulant use. However, these patients may be at very high risk of another ischaemic event if the anticoagulant is removed. These patients may be considered for some

interventional approaches to reduce the likelihood of stroke. One of these interventional approaches is the left atrial appendage closure device, which is inserted transvenously into the left atrial appendage. Other techniques involve clipping the atrial appendage via a thoracoscopy, for example, or excising it using minimal thoracotomy. All of these methods are designed to take away the left atrial appendage where approximately 90% of the atrial thrombi form. We have very extensive studies, both registries and randomised studies with left atrial appendage closure suggesting that there are some definite indications for its use, so it is very important in people who have bleeds with anticoagulants that cannot be managed successfully, otherwise.

There are some other cases in which despite successful anticoagulation people still have systemic strokes. Part of the reason may be poor patient's adherence to the anticoagulant drug regimen. NOACs have short-half-lives, which means patients have to take the drug everyday according to prescription, otherwise they are at risk of stroke. If they fail to do that or stop the drug because they cannot longer pay for it, then perhaps in those patients an intervention like left atrial appendage closure, excision or clipping may be the best option.

“Patients may be considered for some interventional approaches to reduce the likelihood of stroke. One of these interventional approaches is the left atrial appendage closure device, which is inserted transvenously into the left atrial appendage.”

LAA closure with the WATCHMAN™ device: A clinically proven treatment

Non-vitamin K antagonist oral anticoagulants have overcome some of the limitations associated with vitamin K antagonists (eg. warfarin), such as food-to-drug interactions, but not all. Therefore, alternatives to oral anticoagulation are still needed, and percutaneous closure of the left atrial appendage (LAA) has emerged as a non-pharmacological approach to reducing the risk of stroke for patients with atrial fibrillation. *Cardiac Rhythm News* reviews the available clinical data for the most well-known and well-studied LAA closure device: WATCHMAN™ (Boston Scientific).

David Holmes (Department of Cardiovascular Diseases, Mayo Clinic College of Medicine, Mayo Clinic and Mayo Foundation, Rochester, USA) says that there are a “large number” of patients with atrial fibrillation who are at increased risk of stroke “who either cannot or choose not to take anticoagulation”. He adds that a recent study indicated that about 50% of patients with the highest risk of stroke (CHA₂DS₂-VASc score exceeding 4) do not receive oral anticoagulation.¹

According to Holmes, a high risk of bleeding is a key reason why a patient might not be prescribed oral anticoagulation. For example, he comments, they could have “a history of gastrointestinal bleeding or other problems associated with bleeding”.

A history of non-adherence to drug regimens can also be why a patient may not be a suitable candidate for oral anticoagulation. Holmes notes: “Some patients are just not going to take the drug; no matter what they tell you.” He adds that patients who do not adhere to drug regimens range from those with dementia, who may only remember to “take the drug every other day when they should be taking it every day”, to those who just “get busy doing other things”.

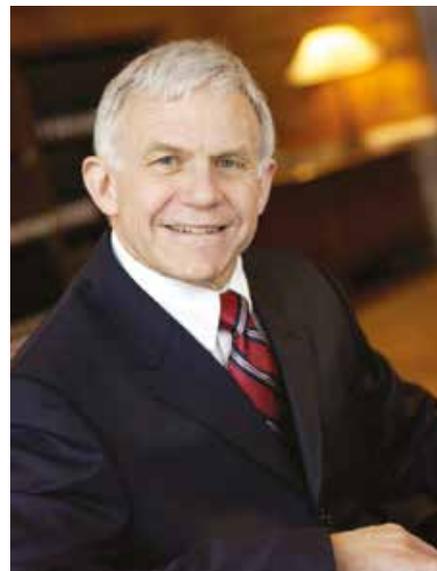
Therefore, for these patients, WATCHMAN™ may be a suitable alternative to oral anticoagulation. The device is CE-mark approved and is the only FDA approved device for the prevention of stroke in patients with non-valvular

atrial fibrillation who have an increased risk for stroke and systemic embolism (based on their CHADS₂ or CHA₂DS₂-VASc scores) and who are eligible for anticoagulation therapy. It is also used around the world for patients who have a contraindication to anticoagulation therapy.

Reddy *et al* report that WATCHMAN™ consists of a self-expanding, nitinol frame with fixation barbs and a permeable, polyester fabric covering.² They add that transoesophageal echocardiography is used to guide the delivery of the device and that the imaging modality is also, alongside angiography, used to verify the proper position and the stability of the device.

Clinical data

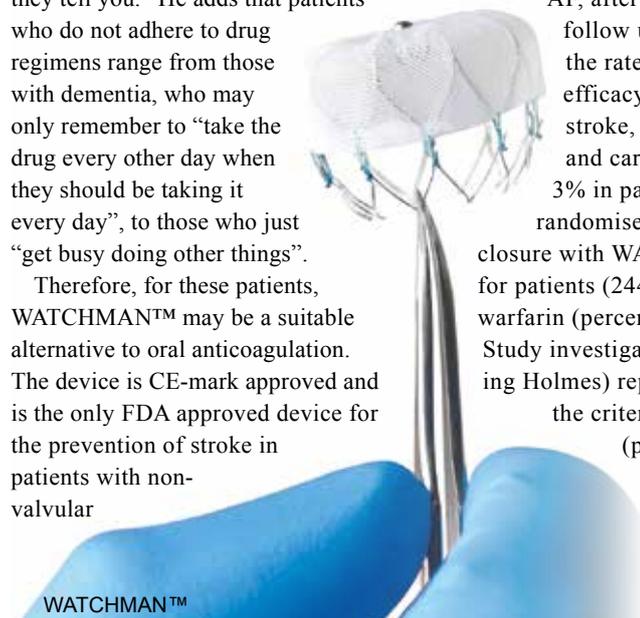
Several studies have now shown that the device is non-inferior to warfarin in terms of stroke prevention. In the randomised control trial (RCT) PROTECT AF, after 1,558 patient years of follow up (mean 2.3±1.1 years), the rate of the composite primary efficacy endpoint—including stroke, systemic embolism, and cardiovascular death—was 3% in patients (463) who were randomised to undergo LAA closure with WATCHMAN™ vs. 4.3% for patients (244) randomised to receive warfarin (percent per 100 patient years). Study investigators Reddy *et al* (including Holmes) report that this finding “met the criteria for non-inferiority (probability of non-inferiority >0.999). Furthermore, after 2,621 patient years of follow-up (3.8 years), the rate of the



David Holmes

primary endpoint was 8.4% for patients who received WATCHMAN™ compared with 13.9% for patients who received warfarin—meeting both the criteria for non-inferiority (posterior probability >99.9%) and for superiority (posterior probability 96%).³ This longer follow-up also showed, Reddy *et al* report, that “patients in the device group demonstrated lower rates of both cardiovascular mortality (60% lower) and all-cause mortality (34% lower)”.

These data are supported by the PREVAIL RCT,⁴ which Holmes says was conducted to further evaluate the safety and efficacy of the LAA closure approach with WATCHMAN™ (for stroke prevention), and the inclusion criteria of PREVAIL was also made stricter than that of PROTECT AF”. In PREVAIL, of which Holmes was the principal investigator, WATCHMAN™ was non-inferior to chronic warfarin for the prevention of stroke and systemic embolism beginning one week after randomisation and the primary efficacy endpoint (composite of stroke, systemic embolism and cardiovascular/unexplained death) of early and late events was similar and did not achieve non-inferiority with the WATCHMAN™ device. Holmes *et al* note: “Although non-inferiority was not



WATCHMAN™

achieved for overall efficacy, events rates were low and numerically comparable in both arms.” They conclude: “This trial provides additional data that LAA closure is a reasonable alternative to warfarin therapy for stroke prevention in patients with non-valvular atrial fibrillation who do not have an absolute contraindication to short-term warfarin therapy.”

A pooled analysis of the data from both PROTECT AF and PREVAIL has provided insights into the risks of bleeding with WATCHMAN™.⁵ This study found that after three years of follow-up, there were no significant differences in major bleeding between patients who underwent LAA closure with WATCHMAN™ and those who received warfarin. However, beyond the procedural period, the device was associated with a significant reduction in bleeding, “particularly once adjunctive pharmacotherapy was discontinued,” study authors Price *et al* note. They conclude: “The favourable effect of left atrial appendage closure on long-term bleeding should be considered when selecting a stroke prevention strategy for patients with non-valvular atrial fibrillation.”

Additionally, Holmes *et al*⁶ performed a patient-level meta-analysis to evaluate the totality of data for WATCHMAN™.

This study included data for all randomised patients from the PROTECT and PREVAIL and data from two non-randomised registries. The authors report: “By including these data from over 2,200 patients and ~6,000 patient years of follow-up, we provide the most comprehensive assessment to date of the efficacy of Watchman LAA closure for stroke prevention.”

According to Holmes *et al*, the results of the study show: “In patients with non-valvular atrial fibrillation at increased risk for stroke or bleeding who are candidates for chronic anticoagulation, LAA closure resulted in improved rates of haemorrhagic stroke, cardiovascular/unexplained death, and non-procedural bleeding compared to warfarin.”

The use of WATCHMAN™ may also be cost-effective. Reddy *et al*⁷ found that LAA closure with the device was “a cost-effective and cost-saving solution for stroke risk reduction in patients with non-valvular atrial fibrillation who are at risk for stroke but have contraindications to warfarin.”

References

1. Hsu *et al*. *JAMA Cardiol* 2016; 1: 55–62.
2. Reddy *et al*. *Circulation* 2013; 127: 720–29.
3. Reddy *et al*. *JAMA* 2014; 312: 1988–98.
4. Holmes *et al*. *J Am Coll Cardiol* 2014; 64: 1–12.
5. Price *et al*. *JACC: Cardiovascular Interventions* 2015; 8: 1925–32.
6. Holmes *et al*. *J Am Coll Cardiol* 2015; 65: 2614–23.
7. Reddy *et al*. *Europace* 2016; 18: 979–86.

Key points

- Despite the advent of non-vitamin K antagonist oral anticoagulants, there is still a need for alternative approaches to reducing the risk of stroke in patients with atrial fibrillation.
- PROTECT AF found that WATCHMAN™ is non-inferior to warfarin in terms of preventing stroke.
- Extended follow-up of PROTECT AF suggests WATCHMAN™ is superior to warfarin for the prevention of a composite endpoint of stroke, systemic embolism, and cardiovascular death.
- PREVAIL supported the findings of PROTECT AF that WATCHMAN™ is non-inferior to warfarin regarding the prevention of stroke or systemic embolisation (seven days after implantation).
- WATCHMAN™, compared with warfarin, may reduce the risk of bleeding (after the procedural period) and is associated with favourable quality of life.

The WATCHMAN™ device in clinical practice

Randomised controlled trial data for percutaneous closure of the left atrial appendage (LAA) with WATCHMAN™ (Boston Scientific) indicate that, in patients with atrial fibrillation at increased risk for stroke, the device is non-inferior to warfarin in terms of stroke prevention. Further data have come from the real-world EWOLUTION prospective registry, which found that the rate of serious adverse events within the first seven days of WATCHMAN™ being implanted was 2.8%—a lower rate than reported in the clinical trials.

The randomised controlled trials—PROTECT AF¹ and PREVAIL²—that assessed the safety and efficacy of WATCHMAN™ focused on patients who were eligible for treatment with warfarin. But Martin Bergmann (Cardiologicum Hamburg, Hamburg, Germany) believes that the device is a suitable treatment for the “many patients” who cannot take oral anticoagulation (including non-vitamin K antagonist oral anticoagulants or NOACs) because of concomitant medication or comorbidities.

He adds that this is where percutaneous closure of the LAA “belongs”, noting that low doses of NOACs in patients who are unable to tolerate a full dose have been found to be “ineffective”.

According to Bergmann, given that the randomised controlled trials have shown WATCHMAN™ to be safe and effective for stroke prevention in patients with atrial fibrillation, there is “no reason to believe” more randomised controlled trials will be conducted—particularly for the patients who cannot take oral anticoagulation.



Martin Bergmann

Therefore, he says: “Only real-life studies will show us the risks and benefits of using the device in this population.”

EWOLUTION

One such real-life study is the EWOLUTION prospective registry,³ of which Bergmann is a

Continued on page 6

Continued from page 5

steering committee member (heading the interventional part). It was started two years ago to provide real-life data for the periprocedural risks associated with implanting WATCHMAN™, looking at if these risks differ between centres experienced at implanting WATCHMAN™ and centres with less experience. Bergmann states that another aim is to compare the periprocedural risks observed in the registry with that seen in the randomised controlled trials.

In this prospective, multicentre registry, more than 1,000 patients were enrolled at 47 centres from 13 countries. Bergmann says enrolment finished in May 2015—“several months earlier than planned”—because the recruitment process was “quite fast”. Boersma *et al.*, reporting on the 30-day outcomes of patients in the registry (in the *European Heart Journal*), state that 60% of the patients were male, the mean age was 73 years, and the average CHA₂DS₂VASc score was 4.5±1.6 (ie. a high risk of stroke). They add: “All patients had a sufficiently high risk for stroke to warrant the use oral anticoagulation therapy. However, 62% of patients were deemed unsuitable for oral anticoagulation therapy by their physician, based on factors such as comorbidities, the inability to adhere to oral anticoagulation therapy, bleeding history or high bleeding risk.” Furthermore, “nearly one third” of patients had a history of major bleeding and 40% had a HAS-BLED score of three.

Boersma *et al* comment that the device was “successfully deployed” in 1,004 of 1,018 patients (98.5%) enrolled in the registry “comparing favourably with previously reported rates in other WATCHMAN™ trials”. The rate of device-related serious adverse events (SAE) within the first seven days of the implantation procedure was 2.8%, which the authors note “is lower than in any of the prior WATCHMAN™ LAA closure trials”. Of 31 SAEs that occurred within one day of the procedure, all but one were “managed effectively with complete recovery of the patient”. At 30 days, the rate of total SAEs was 7.9% with the rate of procedure and/or device-related events being 3.6%.

“The incidence of serious adverse events through seven or 30 days (whether or not related to the procedure) did not appear to be related to CHADS₂ or CHA₂DS₂VASc scores, nor was it generally different for patients on oral anticoagulation therapy after implant vs. patients not on oral anticoagulation after implant,” Boersma *et al* write. However, they add that the rate of serious



WATCHMAN™

adverse events was “significantly lower” for patients ineligible for oral anticoagulation therapy compared with those eligible for such therapy (6.5% vs. 10.2%, respectively; $p=0.042$). They conclude: “The WATCHMAN™ device has a high success rate of LAA closure with low periprocedural risk, even in patients with more comorbidities and higher risk for stroke and bleeding.”

Bergmann says these periprocedural data “are very important” because in the randomised controlled trials, “the periprocedural risk was a little bit high, so we wondered if all of the training that has taken place and the experience of some of the centres would mean that this risk would come down. Indeed, we did find the risk to be much lower than previously shown.” Boersma *et al* do state in the EWOLUTION registry, “all implanting physicians underwent thorough training and certification programme to ensure an appropriate level of experience in order to minimise patient risk.”

Three-month data

Presenting the three-month outcome data from EWOLUTION at the 2016 EuroPCR meeting (17–20 May, Paris, France), Bergmann reported that successful procedural closure of the LAA with no or minimal residual flow (≤ 5 mm assessed via periprocedural transoesophageal echo, TEE) was achieved in 98.9% at first follow-up and that the rate of device/procedure-related SAE was 4.4%. He also noted that 4.1% of patients with device/procedure-related SAE or unknown “fully recovered”. Only 0.5% of the device/procedure related events or unknown proved to be fatal (compared with 2.7% of the unrelated events): “There was a low rate of periprocedural events despite the high-risk, mostly ineligible for oral anticoagulation patient population. Centres with less experience had similar high success rates with low complications compared to more experienced centres,” Bergmann commented. He added: “Most importantly, EWOLUTION found that dual antiplatelet therapy was safe after WATCHMAN™ implantation. There was no increase in stroke or thrombus at the device after three months with >80% of patients having documented TEE follow-up. No late gaps!”

Additionally, NOAC therapy for the first three months “appears to be an option”, with Bergmann noting that there was a very low rate of bleeding and stroke, and no thrombus on the device, in patients who received NOACs. After three months, all patients were switched to aspirin.

Key points

- According to the 30-day outcome data from EWOLUTION, the WATCHMAN™ device is associated with a high success rate of LAA closure with low periprocedural risk, even in patients with more comorbidities and higher risk for stroke and bleeding.
- The three-month data show that centres with less experience had similar high success rates with low complications compared to more experienced centres and that DAPT therapy and NOAC are feasible and safe.

Implications for the future

Bergmann says that the available data from EWOLUTION “will and should have a huge impact” on clinical practice, explaining that there were uncertainties about the use of WATCHMAN™ in patients who have “relative contraindications to anticoagulation”. He adds that the European Society of Cardiology (ESC) gives percutaneous LAA occlusion in patients with contraindications for long-term oral anticoagulation a Class IIb Level of Evidence B recommendation (ie, may be considered).⁴ Therefore, data from EWOLUTION may help to strengthen this recommendation in future versions of the guidelines—the ESC is due to revise its guidelines for the management of atrial fibrillation later this year. “With the EWOLUTION registry, we can confirm to all those that have been sceptical about WATCHMAN™ that, at three months, it is very safe and it is not associated with major bleeding issues. So, WATCHMAN™ can be considered for all patients who are not eligible for full-dose oral anticoagulation therapy,” Bergmann states.

Further data from EWOLUTION, he says, will explore the rate of stroke with WATCHMAN™ as compared with the rate observed in the studies. “We also hope to have country-specific analysis to determine if they have similar outcome data to the overall findings. There is a vast array of questions in the field that needs addressing. For example, is it safe to combine WATCHMAN™ implantation procedures with procedures such as transcatheter aortic valve implantation (TAVI)?”

References

1. Reddy *et al.* *Circulation* 2013; 127: 720–29.
2. Holmes *et al.* *J Am Coll Cardiol* 2014; 64: 1–12.
3. Boersma *et al.* *European Heart Journal* 2016. Epub.
4. Camm *et al.* *European Heart Journal* 2012; 33: 2719–47.

Exploring the benefits of LAA closure as a minimally invasive procedure

Left atrial appendage closure (LAA) with the WATCHMAN™ device is a one-time minimally invasive implant procedure, usually performed by a heart team including electrophysiologists, interventional cardiologists and transoesophageal echocardiographers in a cardiac cath lab or electrophysiology suit. The procedure, which requires transfemoral access, can take less than an hour and one-day hospital stay. Electrophysiologist Timothy Betts (John Radcliffe Hospital Oxford University Hospitals NHS Trust, Oxford, UK) discusses the procedure in detail.



Timothy Betts

Why do both electrophysiologists and interventional cardiologists have the skills and experience to implant the WATCHMAN™ device?

Actually, the skill set required for competent WATCHMAN™ insertion are a combination of those typically developed by electrophysiologists and interventional cardiologists. The implant procedure requires an atrial transeptal puncture, something electrophysiologists do on a daily basis for catheter ablation of atrial fibrillation. They are also used to manipulating catheters in the left atrium and cannulating the left atrial appendage. On the other hand, interventional cardiologists may be more familiar with handling nitinol closure devices and dealing with complications such as device embolisation. A competent WATCHMAN™ implanter needs both of these attributes; they can learn the techniques of other specialists, but often the optimal solution is to work together as a team.

What is the role of the heart team in WATCHMAN™ procedures?

Selecting the right patient for percutaneous LAA closure with WATCHMAN™

Gilles Montalescot (Institut de Cardiologie, Centre Hospitalier Universitaire Pitié-Salpêtrière (AP-HP), Paris, France) discusses which patients would benefit the most from undergoing LAA occlusion with WATCHMAN™.

How many patients with atrial fibrillation cannot take oral anticoagulation?

It is difficult to say exactly

Working together and sharing expertise is the best way to start a left atrial appendage closure programme. In time, as new skills are learned, this may not always be necessary. The third team member—the transoesophageal echocardiographer—should not be forgotten. High quality periprocedure imaging is just as important as manual skills.

In your experience, how long does the WATCHMAN™ procedure take?

Once the learning curve is overcome, a typical procedure takes less than 60 minutes (sometimes less than 30 minutes) from the point at which venous access is gained. There is of course the additional time required to induce and recover from general anaesthesia or deep sedation.

After undergoing a procedure to receive the WATCHMAN™ device, how long is a patient in hospital?

We still keep people in for one night afterwards, but this is often because they are elderly and have travelled a long way. I am sure many could be done as a day-case procedure.

During the recovery period in hospital, what are the key priorities when monitoring the patient?

The usual monitoring of the femoral vein puncture site—as with any interventional procedures—is the priority. We also monitor vital signs to look for rare complications such as a late presentation of pericardial effusion, but in my experience this is less than 1% of patients. The recovery period is usually quick and uncomplicated.

After hospital, how frequently should the patient be followed-up?

Conventionally, patients are seen at six to eight weeks. A transoesophageal echocardiogram is done to check whether the device remains in place, has sealed the appendage and there is no thrombus on the surface. Significant leaks are fortunately very rare, less than one in 50 patients. Thrombus may be seen in one out of 25–30 patients. It almost never results in an adverse event, but most would treat with a short course of anticoagulation (or extending the use of periprocedure anticoagulation). The sixth-week transoesophageal echo is largely historical, coming from clinical

trial protocols, but I still think it is a good way to monitor and audit the effectiveness of this novel technology. The sixth-week visit also allows the reduction or cessation of periprocedure antiplatelet or anticoagulant therapy.

What are the key priorities when monitoring the patient postdischarge?

As mentioned above—it is important to check whether the device remains in place (late embolisation of a WATCHMAN™ occurs in well under 0.5% of patients), if there is a good seal, with no large peri-device leaks and no device-related thrombus, so antiplatelets or anticoagulants can be reduced and/or stopped.

Which specialists should be involved in the follow-up?

The implanter and the imaging specialist.

because the figure is changing. Some patients have contraindications or are not suitable for warfarin, but can be treated with the non-

vitamin K antagonist oral anticoagulants (NOACs). Other patients receive aspirin instead of warfarin; according to the AVERROES trial, such

patients would be eligible for apixaban (Eliquis, Bristol-Myers Squibb) at least. In real life, according to registry data, half of

Continued on page 8



Gilles Montalescot

Continued from page 7

the atrial fibrillation population are not—or not adequately—anticoagulated. This percentage is higher in patients above the age of 80.

Which patients are eligible for LAA closure?

Those patients with atrial fibrillation who have a prior embolism and who have a contraindication to oral anticoagulation; a prior history of intracranial haemorrhage; or a history of anticoagulant treatment that was well taken (and well controlled international normalised ratio >2 under warfarin) when the embolism occurred.

Patients with atrial fibrillation and a CHA₂DS₂-VASc score of ≥4 and a contraindica-

tion, intolerance, inefficiency or non-adherence to anticoagulation can also be considered, as can those with CHA₂DS₂-VASc score of 2–4 with a permanent contraindication to anticoagulation.

In the future, LAA closure could also be offered to patients who prefer a device rather than long-term exposure to anticoagulants.

How do you assess if a patient has suitable anatomy for such a procedure?

With transoesophageal echocardiogram (TEE) or computed tomography (CT).

What does the EHRA/EAPCI consensus document for LAA

closure recommend?

It has quite wide indications covering the different situations in Europe. However, it needs to be revised because new data have been published since the initial publication.

What is the role of a multidisciplinary heart team when a patient is being assessed for LAA closure?

The multidisciplinary heart team is essential in this setting! At my centre, we present all of our cases to a specific heart team that includes an interventionalist, an echocardiographer, and anaesthetist, a surgeon, and a radiologist. When needed, we also have a neurologist on the team.

Recommendations on patient selection from the 2014 EHRA/EAPCI expert consensus statement on catheter-based LAA occlusion, include:*

- Oral anticoagulation is the standard of care for stroke prevention in patients with atrial fibrillation with a CHA₂DS₂-VASc score >1. However, LAA occlusion “should be mentioned”.
- Patients with a CHA₂DS₂-VASc score >2 but with contraindications to oral and systemic anticoagulation present the most accepted clinical indication for LAA occlusion. However, the consensus statement authors Camm *et al* note:

“So far, no randomised data targeting this specific group of patients are available. Hence, our statement is based on expert consensus”.

- LAA occlusion can also be considered in patients with an increased bleeding risk under systematic anticoagulation in certain circumstances. For example, patients with a prolonged need for triple oral anticoagulation.

* Camm *et al*. *Europace* 2014; 16: 1397–16.

“I am not worried about having a stroke now that I have had a WATCHMAN™ fitted”

Richard Yates, a 70-year-old retired businessman from Great Missenden (UK), has had atrial fibrillation for almost 20 years and was well-controlled on warfarin for 14 years. However, he had to stop taking warfarin after he suffered a haematoma in his left leg in 2011; meaning he was no longer protected against the risk of stroke. He explains how undergoing left atrial appendage closure with the WATCHMAN™ device has made him feel more confident.



Richard Yates

I was first diagnosed with atrial fibrillation in 1997 and was straightaway given warfarin. For a long time, I had no real problems with the drug—it was well controlled and I was on a low dose.

However in 2011, I suffered a haematoma in my left leg. I had been recovering from a hip operation that took place a few months beforehand and things were going fairly well; I had thrown my sticks away! Then, all of sudden, in the space of a few minutes, my left leg went numb and I could not move it. It took a while to get the diagnosis, but it was eventually discovered that a haematoma had crushed my femoral nerve. My doctors put it down to me being on

warfarin. It was explained to me that being on warfarin long-term makes your blood go “slightly sticky” and, therefore, my blood had gotten itself into a ball—forming the haematoma that crushed my femoral nerve.

As a result of this haematoma, I was immediately taken off the warfarin and, because of the potential associated risks, not given any other form of anticoagulation. Not being on warfarin did not stop any of my activities; at the time, the haematoma meant that my mobility was very limited anyway. However, I was concerned about having a stroke. According to the medical information I was given, I knew I had a high risk of stroke because I was not on

oral anticoagulation.

For four years, I was not on any form of stroke protection until, last year, when I underwent a procedure to have the WATCHMAN™ fitted. For a patient, the WATCHMAN™ procedure sounds very dramatic but I had no worries because I knew the team at the John Radcliffe Hospital (Oxford, UK), where I had the device fitted were very good.

I had the procedure on the Wednesday and was out on the Friday. I have had no adverse effects whatsoever; there was no wound to worry about from where they entered the vein [to deliver the device] but that has healed up now—you would not know that it is there! After the

procedure, I did “take care” for two or three months but that taking care did not stop me doing anything that I was doing before the procedure.

Now that I have had the WATCHMAN™ fitted, I feel much more reassured. I am more confident because I am not worried about having a stroke and before, I did have that concern. Although I did not consciously stop myself from doing activities prior to the procedure, I was probably subconsciously unsure about committing to things. That said, my mobility is still affected by the haematoma (because the femoral nerve was crushed)—my leg supports me but my walking distance is limited.