

HEART
RHYTHM
CLINIC

The Convergent Procedure

Patient Information Booklet

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The Convergent Procedure

Heart Rhythm Clinic is one of a very limited number of clinical partnerships in Australia offering advanced surgical ablation for more difficult Atrial Fibrillation (AF) cases.

Professor Weerasooriya trained in the Convergent procedure in the USA during supervised intensive training in November 2018 and now works in close clinical collaboration with cardiothoracic surgeons for patients offered this treatment strategy.

The Convergent Procedure Treatment Strategy for AF

The goal of the Convergent procedure is to return your heart back to normal sinus rhythm. The procedure is a collaboration between a specialist cardiac electrophysiologist and a cardiac surgeon. Prof Weerasooriya leads the team to identify appropriate candidates who will benefit from the Convergent procedure

The procedure has two stages. The first stage is an aggressive and minimally invasive surgery which is performed by cardiac surgeon and the second stage is mapping and catheter ablation performed by the cardiac electrophysiologist.

The aim of the procedure is to ablate areas of the heart which are considered to be the source of AF. Radiofrequency is used as an energy to ablate and create scar tissue in the focused area of heart to ablate/interrupt AF circuits without causing any significant long-term side effects.

The Convergent procedure has an established track record with over 9000 procedures performed in the US and Europe.

Who is considered and why?

For the vast majority of patients with paroxysmal AF and a structurally normal heart, catheter ablation using radiofrequency energy (focused heat) only targeting the pulmonary veins (Pulmonary Vein Isolation or PVI) will provide an excellent suppression of AF. This is done by a cardiac electrophysiologist and in most cases only requires an overnight stay in hospital. When this is successful the patient experiences an improvement in quality of life as a result of symptom control and avoiding the need for anti-arrhythmic medication.

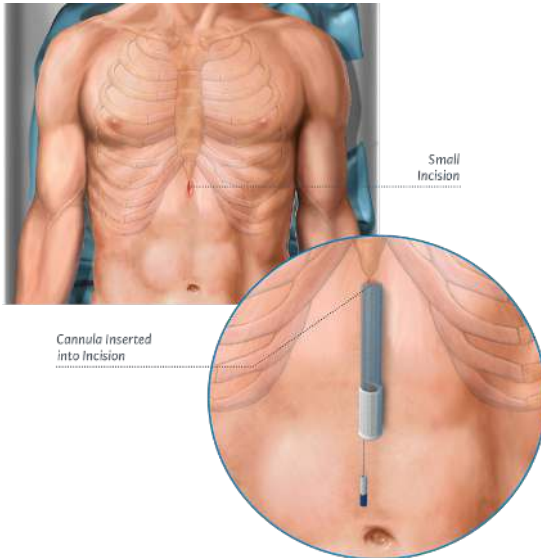
The Convergent procedure is considered when we suspect that AF is being initiated and maintained by diseased areas outside of the pulmonary veins. Most patients considered for the Convergent procedure will have persistent AF (AF that lasts continuously for more than 7 days) or will have failed previous attempts at PVI procedures. Prof Weerasooriya identifies patients who are likely to benefit from the hybrid procedure. These patients generally represent the 'difficult end of the spectrum of AF' usually because they have AF sources separate or distant from the pulmonary veins. Not all AF patients are candidates for the Convergent procedure.

What is the difference to catheter ablation?

The Convergent procedure is a significantly more aggressive ablation strategy than standard catheter ablation. It requires a close collaboration between two medical specialists, a surgical team and a cardiology team. The cardiac surgeon will perform the surgical ablation which is the first part of the treatment and then approximately three months later Prof Weerasooriya will perform a catheter mapping and ablation procedure by accessing the heart using catheters inserted at the right groin.

Fundamentally, cardiac surgeons are able to perform minimally invasive 'thoracoscopic' procedures from the outside of the heart, while cardiac electrophysiologists perform minimally invasive procedures using catheters placed within the heart itself. This approach allows for maximum ablation of posterior left atrial wall resulting in debulking of AF sources.

The cardiac surgeon performs a thoracoscopic surgical ablation which requires the use of a specially engineered ablation tool and delivery system. Thoracoscopic surgical ablation is performed on the beating heart with small incisions rather than entirely opening the chest wall and stopping the heart from beating. This significantly reduces risk and results in a more rapid recovery than open heart surgery.



The surgical ablation tool Epi-sense has a much larger working surface than an ablation catheter and, using the same radiofrequency energy as catheter ablation, efficiently ablates a greater surface area of atrial tissue. In addition, the latest design of Epi-sense, which we are using in Perth, allows for the radiofrequency energy to be directed only to the focused area of heart while protecting the structures around. This design helps preventing injury to oesophagus (food pipe) which is highly sensitive to heat. This avoids a nasty complication called atrial oesophageal fistula.



Immediately after the surgical ablation, an additional procedure is performed to occlude and isolate left atrial appendage. The left atrial appendage is a little pouch originating from left atrium. Your left atrial appendage will be occluded with device known as AtriClip PRO2. This serves two important functions:

1. Stroke reduction - the majority of blood clots (>95%) leading to AF strokes originate from the left atrial appendage. Three months following AtriClip, patients no longer have to take blood thinning medications.
2. AF reduction - the appendage muscle tissue becomes strangulated because the pressure of the AtriClip blocks the nourishing blood flow and eventually the tissue beyond the AtriClip dies. This removes another potential non-pulmonary vein electrical source of AF as the left atrial appendage is a well-recognised secondary source of AF triggers.

Each patient has different anatomy and some areas of the left atrium cannot be reached during the surgical part of the procedure. For this reason, at three months post-surgery Prof Weerasooriya will perform an extensive electrical mapping and 'touch up ablation' of the left atrium using specialised mapping tools and 3-dimensional electrical mapping. The pulmonary veins are also checked and re-ablated if necessary during this second component.

Before your surgical procedure

Patients will have separate appointments with Professor Weerasooriya and the cardiac surgeon to assess their suitability to undergo this procedure. Work-up for the procedure involves several tests including but not limited to blood tests, a chest X-ray, and a cardiac CT scan.

After your outpatient review with cardiac surgeon, you will be given information about admission process. You will be reviewed by a nurse in a preadmission clinic. Some blood test will be performed in preparation for procedure. Generally, you will be admitted to hospital one night prior to your procedure. The patient will have the opportunity to speak with the cardiac anaesthetist prior to the procedure. Specific instructions and preparations for this procedure may include temporarily withholding medications, fasting, and using a special soap to shower.

Anticoagulant (blood thinning) medication

You will be asked to stop your anticoagulation medication 48-72 hours prior to procedure. You must discuss this with the surgeon prior to procedure. Failure to stop these medications may result in cancellation of procedure due to increased risk of bleeding.

On the day of admission for your surgical procedure

The patient will be admitted to hospital night prior to procedure and will be asked to change into a surgical gown. Nurses and hospital staff will ask about the patients' health history and medications and an ECG and blood tests will be performed. Body hair may be clipped. All your blood results and reports will be reviewed. Any of the pending tests may be completed during the day. Your anaesthetist will meet with you to discuss the anaesthetic and

management of post-operative pain. Please discuss any concerns you have regarding anaesthesia or pre-procedure anxiety.

The cardiac surgeon may visit you during the day in case you have any queries.

On the day of your surgical ablation procedure



During the surgical ablation procedure, the patient will be under a general anaesthetic administered by a cardiac anaesthetist using an IV line. After the patient is under anaesthesia, a urinary catheter and other monitoring lines are inserted. The cardiac anaesthetist will perform transesophageal echocardiogram (TOE) to check for blood clots in the heart. The procedure will be abandoned in the unlikely event of any clots detected in the heart.

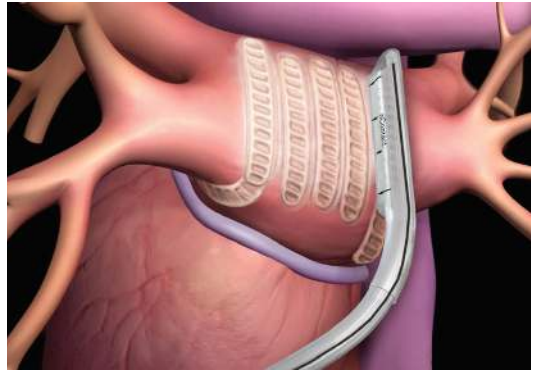
TransOesophageal Echo (TOE)

A Transoesophageal Echo is an ultrasound procedure where a probe is placed down your oesophagus (food pipe) to take high quality images of your heart. Medication is administered to make you drowsy and more comfortable. The TOE procedure is performed in a hospital as a day case and takes 3-4 hours (including recovery).

The surgeon will then make a small incision. He will then use telescope guided radiofrequency tool, to create scar tissue on the outside of the back wall of the left atrium that will destroy the irregular electrical pathways. Your heart will NOT stop beating during this procedure. The surgical part of the procedure lasts 2 to 3 hours. A small drain will be placed in the cavity outside the heart.

After the surgical ablation, the surgeon will also place the AtriClip left atrial appendage occlusion device using 3 small incisions (1-1.5cm) placed on the left side of the chest. This usually takes less than 30 minutes.

The patient will be woken after the procedure is completed.



After your surgical procedure

Once the procedure is complete the patient will be returned to the intensive care unit for 24 hours and following this to the cardiac surgery ward for 2-3 more days. During this time, the heart will be carefully monitored. Heart rate, heart rhythm, blood pressure, and oxygen level will be continuously monitored. A tube will be used to drain fluid from outside the heart and will be removed 24-48 hours post-op. An IV will administer fluids and medication will be prescribed to manage the pain. The ward nurse will assess your pain on a scale of 1 to 10 and administer pain killers appropriately. Please ask for additional pain killers if you are experiencing pain.

The day following procedure your nursing team will help you sit in chair and walk in the corridor. This will help you recover from surgery.

The cardiac surgeon will talk to you about the procedure on the following day and you can discuss any questions you have. Prof Weerasooriya will be actively involved in managing your arrhythmia medications and he will visit you in hospital after the surgery.

At this stage your heart rhythm may be regular but don't be disappointed if still in AF.

On the day of discharge

A day prior you will be notified your discharge time and date. You will have a dressing on your chest which can be removed by yourself or your GP after 2 weeks. You will go home with 2 stitches on the left side of chest which will be removed by your GP after 5 days.

You will be given a list of medications and a referral for an echocardiogram to be undertaken in 2 weeks and a cardiac CT in 4 weeks. You will already have an appointment to see Prof Weerasooriya in his rooms in 4-8 weeks after procedure. The cardiac surgeon will see you for follow-up after 4 weeks.

Post discharge care

Do not apply any ointment or creams on wounds. If you have any unusual pain or redness, please visit your GP and notify the cardiac surgeon.

Do take showers. You can discuss with nurse prior to discharge about care to be taken during shower. Please do not go for swimming or in bathtub for 2-3 weeks until the wounds are completely healed.

Stay active at home. Take rest in between activity. It is not uncommon to feel tired easily and you should see gradual improvement in your stamina. Avoid lifting more than 5 kg for 3 weeks following the procedure.

Do not drive a motor vehicle for 2 weeks.

Complications

Fortunately, they are uncommon given the nature of the procedure. The most relevant complications are:

1. Cardiac perforation or injury – any procedure on the heart has this risk. It is quite an uncommon complication, however the management of this requires sternotomy (breastbone incision) and repair of the injury. Since the first stage of the procedure is done by a cardiac surgeon, they are very capable of efficiently dealing with such a complication in the event it occurs
2. Pericarditis – The pericardium is a sac around heart. To gain access to heart, the surgeon will incise the sac and the instruments and catheter used during procedure can rub against the sac. This and other aspects of the procedure leads to inflammation of the sac which is called “pericarditis” (inflammation of the pericardium). These complications can manifest as pain, fever, fluid build-up in the pericardial sac. Please contact Prof Weerasooriya with concerns about this.
3. Stroke – Although very rare it is worth a mention. It can result during or after the procedure due to formation of small clots in the atrium. You will have an intraoperative transoesophageal echocardiogram to assess and

confirm the absence of any before the procedure. After surgery, you will be commenced on blood thinners to prevent clot formation in the heart.

4. Pericardial effusion – this is the fluid build-up around heart. This can occur secondary to inflammation of the pericardium. Depending on its size we may observe it or aspirate it with a needle. This can occur after you are discharged. It can cause shortness of breath, fever, flu like symptoms, sweats or fast heartbeat. Please contact Prof Weerasooriya if you experience any of these symptoms.
5. Incisional hernia – some patients may experience a hernia under the incision. This may lead to abdominal structures like intestines to migrate under skin incision intermittently (hernia). Please consult your cardiac surgeon if you notice such development

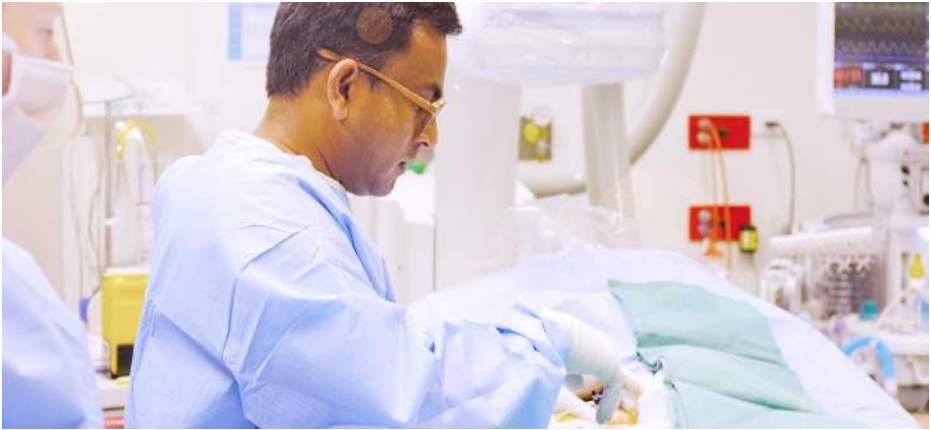
Follow up appointments

You will be reviewed by your surgeon in the clinic at 4 weeks with chest X-ray and cardiac CT. At this visit you will get a chance to discuss any question results of the procedure. You will be discharged from the surgical clinic at this stage if there are no ongoing issues.

You will be reviewed by Prof Weerasooriya 4-8 weeks after your surgical ablation with a Holter monitor prior to determine whether or not you are in sinus rhythm. It is very normal to require a DC cardioversion following the surgical ablation.

A DC cardioversion uses an electric shock to literally shock the heart back into rhythm. This is performed under a brief (minutes) general anaesthetic and the patient is discharged 2 hours later.

At three months post-surgical ablation Prof Weerasooriya will book your mapping and ablation procedure.



Electrophysiology procedure (mapping and ablation)

Comparatively this procedure is significantly less invasive than the surgery and is done to document completeness of the surgical ablation with some additional 'touch up' ablation from within the heart to complete the posterior wall ablation. The pulmonary veins are also checked and ablated if necessary, during this second component.

An entire booklet describing this procedure is available separately - see www.heartrc.com.au

Success rate

The success rate of the Convergent procedure is highly dependent on individual patient circumstances. We know that patients with AF can significantly improve their success rate of any AF intervention by maintaining a healthy weight by diet and exercise, addressing sleep apnoea if it is present, managing any coronary disease aggressively and keeping blood pressure and blood sugar within tight control.

As a general guide, we expect a minimum success rate of 70% for any patient being considered for this treatment. Some patients have clinical features that suggest a poor outcome and they would be refused. Importantly, the surgical component of the Convergent procedure cannot be repeated due to the formation of scar tissue. Patients can have repeated catheter ablation following the Convergent procedure if required.

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