

Transvenous Cardiac Pacing

What is this procedure?

When the heart persistently beats at an abnormally slow rate, the blood supply of vital organs may be threatened. This condition is called bradycardia. It is commonly caused by cardiac conduction disturbance which may arise from electrolyte imbalance, drug toxicity, infection, inflammation, or a coronary artery event. Under life-threatening conditions, cardiac pacing using battery-powered pulse generator to stimulate heart contraction will be required. Transvenous cardiac pacing by the insertion of a pacemaker wire through the vein into the heart is a frequently used technique performed in the Intensive Care Unit (ICU).

Why is there a need to do it?

Transvenous pacing is indicated for slow heart rate resulting in unstable blood pressure, or as a bridging step before implantation of a permanent cardiac pacemaker.

How is it done?

Before the Procedure:

The doctor will explain the procedure and obtain patient's written consent if condition allows. The insertion site may be shaved. Temporary pads may be applied to the chest to stimulate heart beat while the procedure is being done.

The Procedure:

The procedure will be performed by either an ICU doctor or a cardiologist under local anaesthesia. The needle puncture site is usually in the neck or groin region or just below the collar bone. An introducer sheath is inserted into a central vein via a guidewire. The pacing wire, being connected to an external pulse generator, is then inserted to the vein via the introducer sheath. The doctor will check the position of the pacing wire using guidance from surface ECG or real-time X-ray imaging. Appropriate pacing mode and settings will be chosen. The pacing wire is secured with a clamp in the introducer sheath. The introducer sheath is then secured with stitches.

After the Procedure:

Rest in bed and avoid excessive neck or groin movement to prevent pacing wire dislodgment. Vital signs including blood pressure, pulse and oxygen saturation will be closely monitored. ECG and Chest X-ray will be ordered to confirm the position of the pacing wire.

Follow Up:

The pacing wire and introducer sheath will be removed when they are no longer required. The needle puncture hole will heal by itself, usually leaving minimal scarring. If needed, implantation of a permanent cardiac pacemaker will be arranged by a cardiologist.

Risks and Complications

General risks: Apply for catheter insertion and include bleeding during insertion, which in very rare condition may cause compression on the airway and impair breathing, and/or trauma to internal organs, depending on the site of catheter of insertion. In very rare situation, the bleeding can be so severe to be life-threatening. Bleeding may also occur during removal of catheter.

Specific risks:

- **Possible risks and complications during catheter insertion:**
 - Irregular heartbeat, which can be life-threatening, e.g. ventricular tachycardia or ventricular fibrillation
 - Pneumothorax (collection of air in the sac containing the lung)
 - Hemothorax (collection of blood in the sac containing the lung)
 - Bleeding
 - Heart perforation and cardiac tamponade (blood in the sac containing the heart and compressing on it)
 - Pulmonary embolism (blood clots or air obstructing lung vessels)

- **Possible risks and complications when the catheter is in place:**
 - Pacing system malfunction
 - Stimulation of the diaphragm leading to hiccup feeling
 - Infection of the wound or wire
 - Blood clot formation in major veins

Possibility that the procedure cannot be carried out

There is a possibility that when the procedure cannot be performed, e.g. if pacing wire cannot be well positioned, or occurrence of side effects which require stopping of the procedure.

Other treatment options

If the patient chooses not to perform this procedure, it will affect the overall condition. The change of the condition is affected by a variety of clinical factors, including the individual patient's physical condition before the onset of illness, the type of disease, the response to treatment and the progress, etc. Your doctor will explain other suitable options to you.



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Disclaimer

The information provided in this booklet is for general reference only. The risks and complications listed above are not exhaustive. Please consult your attending doctor for details.