Tunnelled Central Venous Catheters Placement in Children
兒童隧道式中央靜脈導管手術

Introduction

A tunnelled central venous catheter is indicated in children requiring medium to long term vascular access (e.g. chemotherapy with or without repeated blood taking, prolonged antibiotics, and infusion of parenteral nutrition). It is a soft catheter made of synthetic material placed under the skin, directly entering a large central vein for infusion of medications. Depending on the indication of insertion, a single lumen or dual-lumen catheter may be inserted.

Surgical procedure for tunnelled central venous catheters

There are a few potential sites for placement of the catheter, including the neck (exiting via chest wall), groin (exiting via the lower abdomen), and rarely the below the clavicle (also exiting via the chest wall). The principle of the surgery is to place the tip of the catheter near the heart via a large vein and exiting at another site to minimize infective risks. A cuff is present near the exit site which will anchor the catheter to the subcutaneous tissue over a few weeks after the surgery to minimize migration. The choice of site depends on the surgeon's preference and the child's available access.
A subcutaneous access port maybe incorporated in place of an exit port-catheter; this is occasionally indicated for selected patients according to care-team and surgeon.

An incision is made directly over the desired central vein (entry site); accessing the vein may be via conventional surgical dissection or minimally invasive method under ultrasound guidance according to feasibility. A tunnel under the skin will be created from the exit site. The catheter will be tunnelled through and inserted into the central vein, with its position confirmed on fluoroscopy (X-ray).

Preoperative preparation

In children, the operation has to be performed under general anaesthesia. Fasting is required as indicated by the anaesthetist and it is important to follow these instructions, or else the operation may need to be postponed or cancelled. The operative risks will be explained by the surgeon before the consent is signed, and parents should make sure that all concerns have been answered before signing the

consent. Preoperative anaesthetic assessment will be done by anaesthetist with the risks and complications informed. Please inform the doctors if your child has any medical problems such as allergies and past history of surgery. For patients undergoing chemotherapy, blood tests are mandatory to optimize the coagulation before the surgery.

Postoperative care

There shall be two wounds, one at the entry site and one at the exit site. Normal ambulation is allowed but extra care should be given to avoid the child accidentally pulling out the catheter. The catheter is usually ready for use right after the surgery. The parent care team shall have experienced staff in caring for the catheter to avoid blockage or infection of the catheter.

Risks and complications

In general, tunneled central venous catheter placement is a safe operation with low complication rates. However, potential complications may still occur, please discuss with the surgeons about the incidence.

General

1. Bleeding or wound/ tunnel haematoma
2. Wound infection, abscess or dehiscence
3. Hypertrophic scar

Specific

1. Catheter malpositioning (which may require early revision)
2. Dislodged catheter
3. Catheter blockage
4. Catheter fracture
5. Catheter infection
6. Arrhythmia
7. Pneumothorax (for internal jugular or subclavian vein catheterization)
8. Haemothorax (for internal jugular or subclavian vein catheterization)

Rare but significant (if any)

1. Injury to major vessels and nerves
2. Torrential bleeding
3. Air embolism, pulmonary embolism

Follow up and Catheter removal

The parent team will usually have dedicated staff looking after the daily and long term care of tunneled catheters and their use in drug delivery as inpatient or ambulatory services. Surgeon's follow-up will be mostly on a 'when-required' basis, should utility problems arise or when surgical removal of the catheter is indicated. Removal of ordinary catheter is usually a simple bedside procedure, whereas that for subcutaneous port usually requires to be more formal in operating theatre.

Remarks

This is general information only and the list of complications is not exhaustive. Other unforeseen complications may occasionally occur. In special patient groups, the actual risk may be different. For further information, please contact your doctor.