How to care CVL and Porto-A-Cath in children with cancer

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PORT A CATH

central venous lines (CVLs) were first described by **Dudrick** in 1968

In 1973, the first long-term central venous catheter (CVC) was used forparenteral nutrition

In 1979, the **Hickman catheter**, a long-term venous access device, was used for chemotherapy for the first time .

The introduction of totally implantable port systems started in the early 1980s

The term portacath is a portmanteau of "portal" and "catheter". Port-a-Cath is a brand name of Smiths :MedicalPorts.

Maurizio Gallieni.A Cancer J Clin 2008;58:323-346
S .VEescia .AAnnals of Oncology 19: 9-15, 2008.

Central Venous Port Systems as an Integral Part of Chemotherapy
UlfK TeichGraber.,
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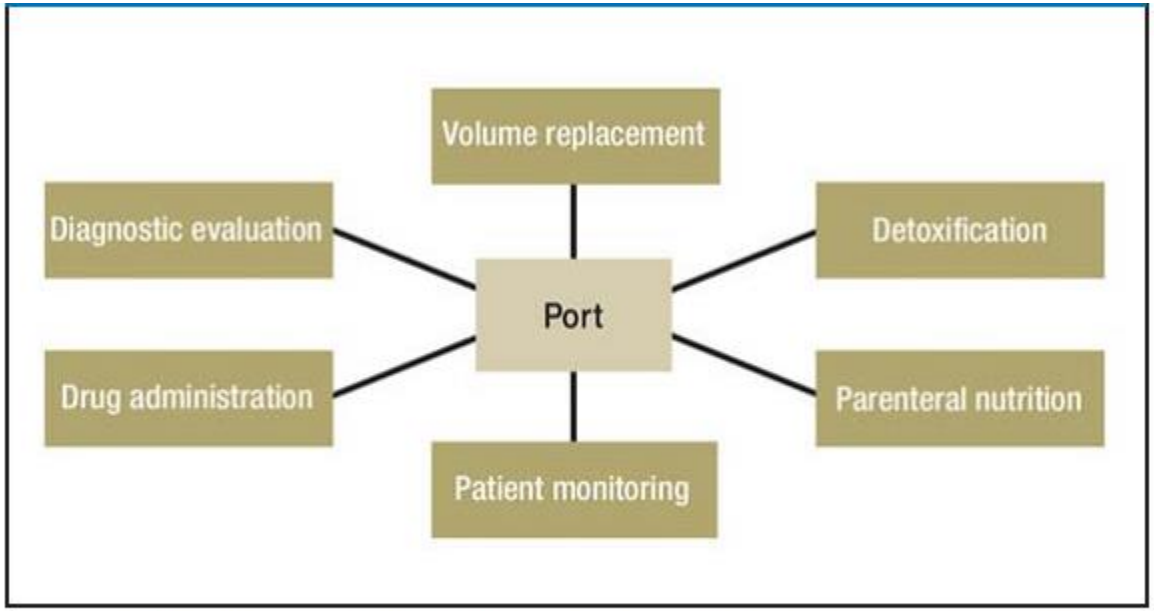
PORT A CATH are indicated for patients who need long-term intravenous treatment involv ing, e.g., the repeated administration of chemotherapeutic drugs, parenteral nutrition, transfusions, infusions, injections, and/or blood sample collection.

Port systems can markedly alleviate the burden of intravenous therapy and thereby **improve these patients' quality of life.**

PORT A CATH



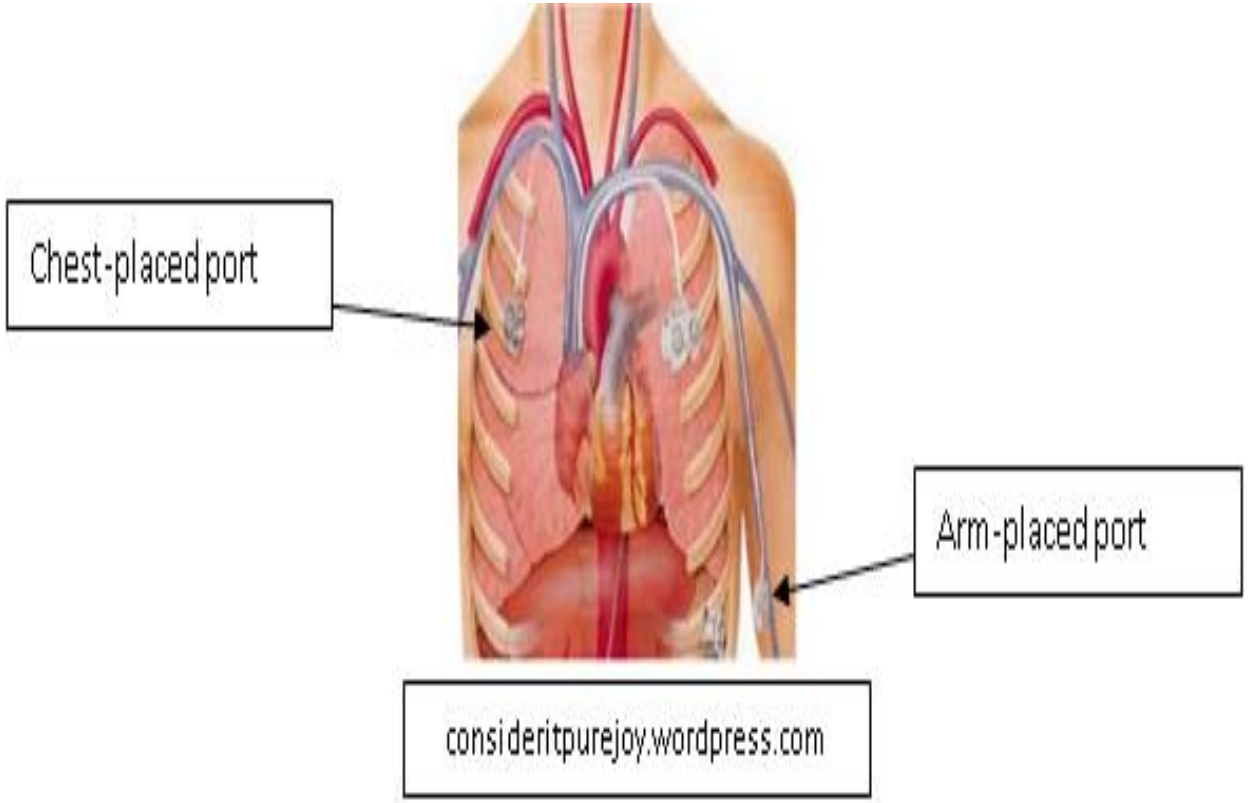
While chemotherapy is the most common indication, central venous ports also have other uses

TYPES OF PORT A CATH

There are two ways of Port placement:

Chest-placed system: This is the most common approach to Port placement. The Port is placed in the chest and the catheter is inserted into a vein in the chest. The tip of the catheter lies in a vein just above the heart.

Arm-placed system: The port and the catheter are inserted into a vein in the upper/lower arm. The tip of the catheter lies in a vein just above the heart.


Chest-placed port
Arm-placed port
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HOME CARE

Resume your usual activities.

x You may walk about as you wish, even climb stairs.

x You may eat as you did before the operation.

x You may shower if you wish, but do not get the dressings or the wound wet before the stitches are removed. Covering the area with a sheet of plastic and sealing the edges usually is satisfactory.

Caring for your child's Port-a-Cath

After the skin over the port is healed, your child may return to normal activities

Call your child's doctor right away if the site around the Port-a-Cath has: bruising — swelling — redness — bleeding — pain
or if your child: — has a fever over 38.3 c— has chills — the port seems to have Moved
The port can go without being used for 30 days.
When it is not being used, it needs to be flushed every 30 days with a medicine (heparin) that prevents the blood

Nursing Policy

Hand Hygiene: Hands shall be washed with an antimicrobial soap before palpating, inserting, changing or dressing any intravascular device.

Administering IV fluids and Medications IV fluids and medications shall be administered via a controlled infusion device.

Tubing and Insertion Site IV tubing, non-coring needles, and dressings shall be changed at least every 96 hours utilizing aseptic technique.

Tubing and dressings shall be dated and timed when changed with appropriate documentation in the medical record.

The insertion site shall be cleansed with chlorhexidine gluconate or Chlora Prep as the first choice and povidone iodine as a second choice, and a light dressing applied if desired.

ACCESSING THE PORT – IMPLANTABLE ACCESS DEVICE 1

I. ACCESSING THE PORT – IMPLANTABLE ACCESS DEVICE

RESPONSIBLE PARTY	ACTION	RATIONALE
MD, RN, RN Applicant	1. Explains the procedure to the patient. 2. Washes hands with approved antiseptic. 3. Opens and prepares supplies. 4. Dons sterile gloves. 5. Cleanses skin with chlorhexidine gluconate, chloraprep or povidone iodine if allergic to chlorhexidine, starting from center of septum and continuing outward to a diameter of 3 inches using a side to side motion .	

ACCESSING THE PORT – IMPLANTABLE ACCESS DEVICE 2

6. Attaches non-coring needle to 10 cc syringe filled with at least 5 cc of normal saline (attaches a luer lock tip if needed).

7. Clears air from tubing and needle, and clamps tubing.

8. Removes gloves.

9. Dons sterile gloves.

10. Palpates/locates portal septum using nondominant hand.

11. Stabilizes portal septum by using thumb and index finger.

ACCESSING THE PORT – ACCESS DEVICE3 IMPLANTABLE

12. Utilizing aseptic technique, accesses the system by inserting needle at a 90 degree angle to the septum, penetrating the skin and septum until contact is made with the bottom of the portal chamber.

13. Unclamps tubing.

Checking Patency

Prior to Administration the system shall be checked for patency (blood return) prior to administration of any fluids, medications, or blood.

CONFIRMATION OF PLACEMENT

Written x-ray report confirming correct placement of port available in patient record.

- With each and every time the port is accessed the nurse is responsible for confirming correct placement by:

    a) aspiration of blood

    b) ability to easily infuse solutions

    c) normal appearance of port site, No signs of infiltration.

- Injects saline into system

Flushing the System

A. The system shall be flushed using sterile technique with 3 – 6 ccs normal saline (using a 10 cc syringe) before and after medications are given.

B. The system shall be flushed with Heparinized Saline (100 units/ml) after each use.

When there are extended periods between injections, infusions, or blood samplings the system shall be flushed using sterile technique with 5 cc Heparinized saline (using a 10 cc syringe) at least once every four weeks.

HEPARINIZING THE PORT 1

RESPONSIBLE PARTY	ACTION	RATIONALE
MD, RN, RN Applicant	1. Explains the procedure to the patient. Washes hands. 2. Follows the procedure for accessing the port using sterile technique. 3. Confirms the correct needle placement (See #14 above). 4. Attaches to a 10 cc syringe with 5 cc of heparinized saline (100 units/ml) and instills all but 0.5 cc.	4. Use of a 10 cc syringe helps to reduce PSI to the system. The smaller the syringe, the higher the pressure that can be generated.

HEPARINIZING THE PORT 2

5. Clamps the tubing prior to withdrawing needle from the port.	5. Helps to create positive pressure thus minimizing retrograde blood flow into the catheter tip.
6. Cleanses site with chlorhexidine gluconate, chloraprep or povidone iodine if allergic to chlorhexidine and applies light dressing, if desired.	
7. Removes gloves and washes hands.	
8. Records procedure on MAR and./or in the 24 Hour Nurses Record as appropriate.	

Difficulty flushing and/or aspirating blood

Check any clamps are open May be due to problem with bung/cap. Change bung/cap.

- If caused by catheter position in vessel wall then try the

following:

lie patient down,

move patient's arms into different positions,

instruct patient to take deep breaths plus/minus cough, instruct patient to move head from side to side.

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PORT A CATH COMPLICATIONS

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Port complications can be subdivided into: procedural complications that arise during **implantation, catheter related complications, and vascular complications**.

Early complications :are those arising between 24 hours and 4 weeks after implantation,

Late complications :are those arising more than 4 weeks after implantation

Early complications

Early complications occur in approximately **6.2% to 11.7%** of patients .

the most common mechanical complications during the insertion of CVCs:

1)Arterial puncture
2)Hematoma

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Early Complications

Pneumothorax

Hemothorax

Primary malposition

Arrhythmias

Air embolism

Arterial perforation causing clinically relevant bleeding

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LATE COMPLICATIONS

Mechanical complications (pinch off, fractures, dislodgement, or migration)

Extravasation injuries

Infections

catheter and vein Thrombosis/occlusion (including deep vein thrombosis, pulmonary embolism, or SVC syndrome)

LATE COMPLICATIONS

The rate of late complications is low:
catheter rupture and embolization 1.5%
(0.063 episodes/1,000 days of use)
venous thrombosis 1.5%
(0.063 episodes/1,000 days of use)
pocket infection 0.3%
(0.012 episodes/1,000 days of use)
port-related bacteremia 2.4%
(0.101 episodes/1,000 days of use)

In a retrospective study by Yildizeli et al,
long-term complications of catheter and port system placement occurred in 6.6% of cases, namely infection (2.2%), thrombosis (1.3%), extravasation (1.3%), catheter fracture (1.8%)

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overall complication rates have been reported from **4.3% to as high as 46%.**

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The reported infection rates in recent studies range from 0.8% to 7.5%.

the most common complication and the most common reason for port explantation.

Pain at port site

Redness, discharge, tenderness, swelling, heat, patient temperature and general unwellness are symptoms of infection associated with the port.

The infection may be at the insertion site, in the port pocket or in the vein.

Do not access port until discussion with physician and document instructions.

- Pain and swelling around the port site may be symptoms of extravasation or leaking of fluid into surrounding tissues.

Stop infusion immediately, notify physician and follow local policy for extravasation.

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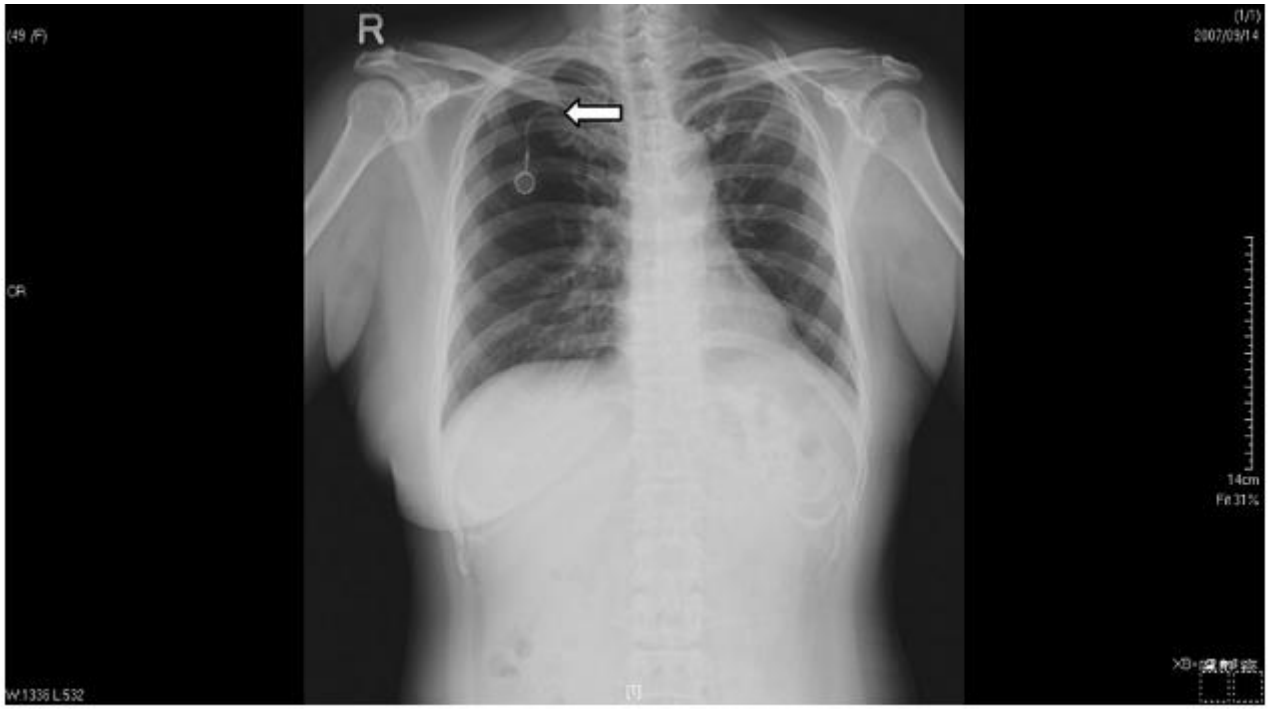
Extravasation is generally treated conservatively

Extensive extravasation may necessitate the implantation of a subcutaneous drain or the explantation of the port.

Breakage of the catheter between the clavicle and the second rib due to pinch-off syndrome. Migration of the breakage catheter to the right ventricle which was removed by the cardiologist



If caused by 'pinched off syndrome' then catheter will be pinched off when patient is sitting but will be free when patient lying flat, therefore use whilst patient is lying flat.

Blockage

Unusually high resistance encountered while administering any agent through the system may indicate blockage.

The physician shall be notified immediately when this occurs, and the administration of the fluid stopped.

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If the port system cannot be unblocked by flushing, it should be investigated with a radiographic contrast study.

Contrast medium is injected through a port needle, and fluoroscopy is performed.

Movement of the catheter, leading to kinking or to displacement of the catheter tip, is a possible cause of sudden loss of patency of the system.

Blockage may be caused by:

- Kinking of the catheter due to movement.

- Lodging of the distal end against the wall of a vessel.
- Occlusion by an intra luminal thrombus.

- Growth of a fibrin sheath around the catheter end

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The common causes of obstruction are bood clot, remnants of parenteral nutrition, and encrusted medications .

To determine the type of obstruction that is present, one should inquire specifically about the manner in which the system was last used.

MechanicaComplications
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COMPLICATIONSl

Disobstruction should always be performed :
using a 10 mL syringe (or larger) so as to avoid inappropriately high pressure, which may damage the catheter, and using the most adequate solution for the presumed type of obstruction (ethanol for lipid aggregates, urokinase or rTPA for clots, NaOH or HCl for drugs, and sodium bicarbonate for contrast medium).

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If a port functions well at first but then gradually becomes more difficult to use, this is often due to the formation of a fibrinous sheath around the catheter near its tip.

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The following procedure can be followed to eliminate the obstruction

First, 100 IU of heparin in 5 mL of 0.9% saline are injected and aspirated without pressure through a 5 mL syringe. If the system is still blocked, the port needle should be removed,

another attempt made to unblock the system with a fresh port needle.

Catheter-related thrombosis:

Introduction

Thrombotic complications can occur with CVC use with reported rates varying from around 5% for symptomatic events1 to an overall rate of 14–18%.

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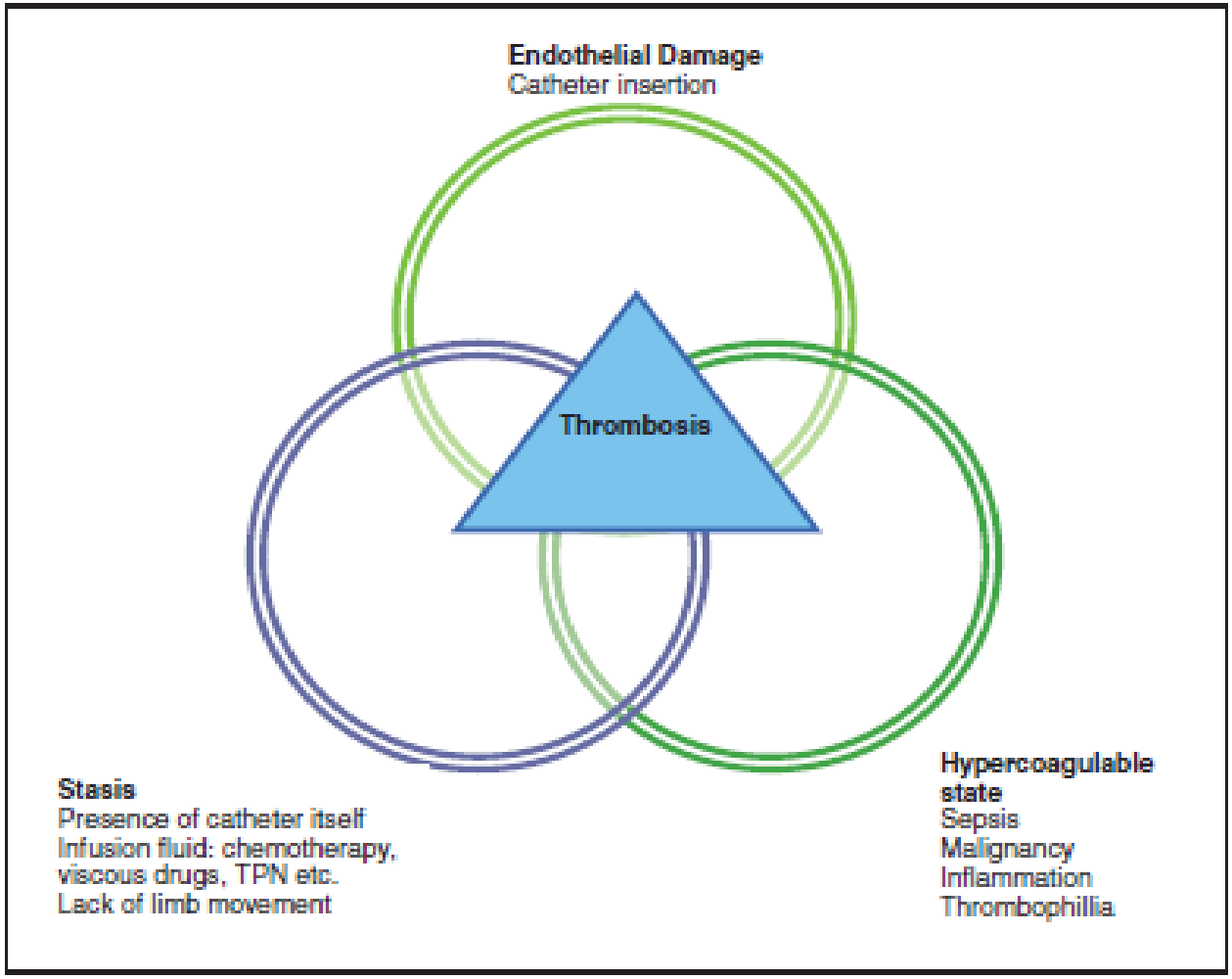
Risk factors

It is useful to remember, in this context, how these factors relate to Virchow's triad of endothelial damage, stasis and hypercoagulability, described as the components involved in thrombus formation



Postulated mechanisms by which the presence of a CVC may contribute to the development of thrombosis.

Some of the risk factors for CRT such as:

(a)location of insertion
(b) the type of CVC

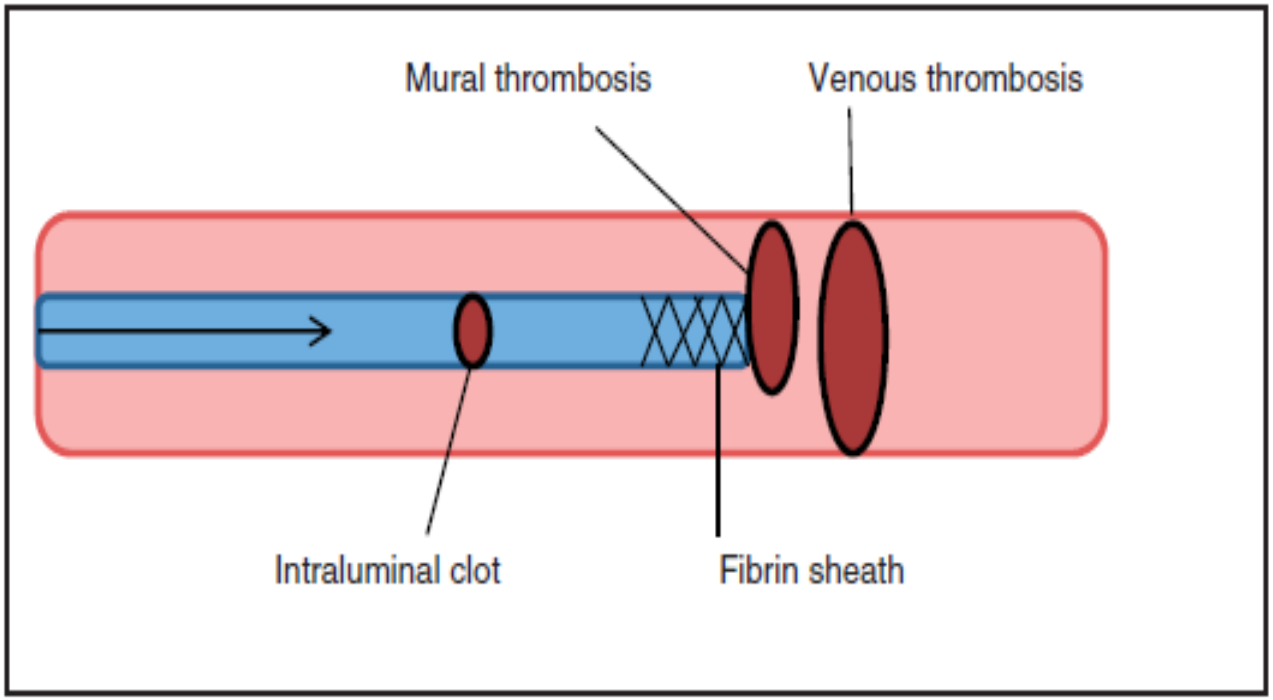
are modifiable and careful consideration of these can minimise the risk for thrombosis.

Clinical symptoms

Table 3. Possible presentations of CRT.

Asymptomatic (majority)
Swelling of head/neck/limb
Localised pain/numbness
Jaw or shoulder pain
Headaches/sensation of head fullness
Superficial venous distension
Inflammation/phlebitis
Erythema of limb
Difficulty with infusion or aspiration
Incidental finding on CT

CT: computed tomography; CRT: catheter-related thrombosis.



. Schematic image of thrombotic events that may be associated with central venous catheters.

Complications

- pulmonary embolism (PE) in 10-15%
- infection
- post thrombotic syndrome (PTS)

Diagnostic approach

- A ‘linogram’ (contrast study) may theoretically be used to confirm internal line kinking or the presence of an intraluminal occlusion, but it is not commonly performed.

Diagnostic approach

- Duplex ultrasound is the initial imaging modality of choice if a CRT is suspected clinically or if lumen patency is not restored with simple measures. It is non-invasive and particularly reliable for assessing thrombi

Diagnostic approach

- If clinical suspicion of CRT is high despite a negative Duplex scan, then contrast venography may be considered as it is the 'gold standard' investigation

Treatment

Factors to consider when treating CRT include:

- . assessment of ongoing need for central access,
- . the functional status of the line
- . the presence of an underlying prothrombotic state
- . review of any contraindications to anticoagulation.

Is CRT the cause of symptoms?

. Occlusion by catheter thrombosis is the next consideration if no other cause is identified. In the case of an intraluminal clot or fibrin sheath formation

1)Urokinase 10,000 units/ml is reconstituted with 3 ml of 0.9% normal saline or water for injection. Each lumen of the occluded catheter is instilled with 5000units of urokinase and left for 2 h. The procedure can be repeated up to three

2)Following the administration of 2mg alteplase with a dwell time of 120min, 78% patency was achieved with one dose,rising to 87% after a second.

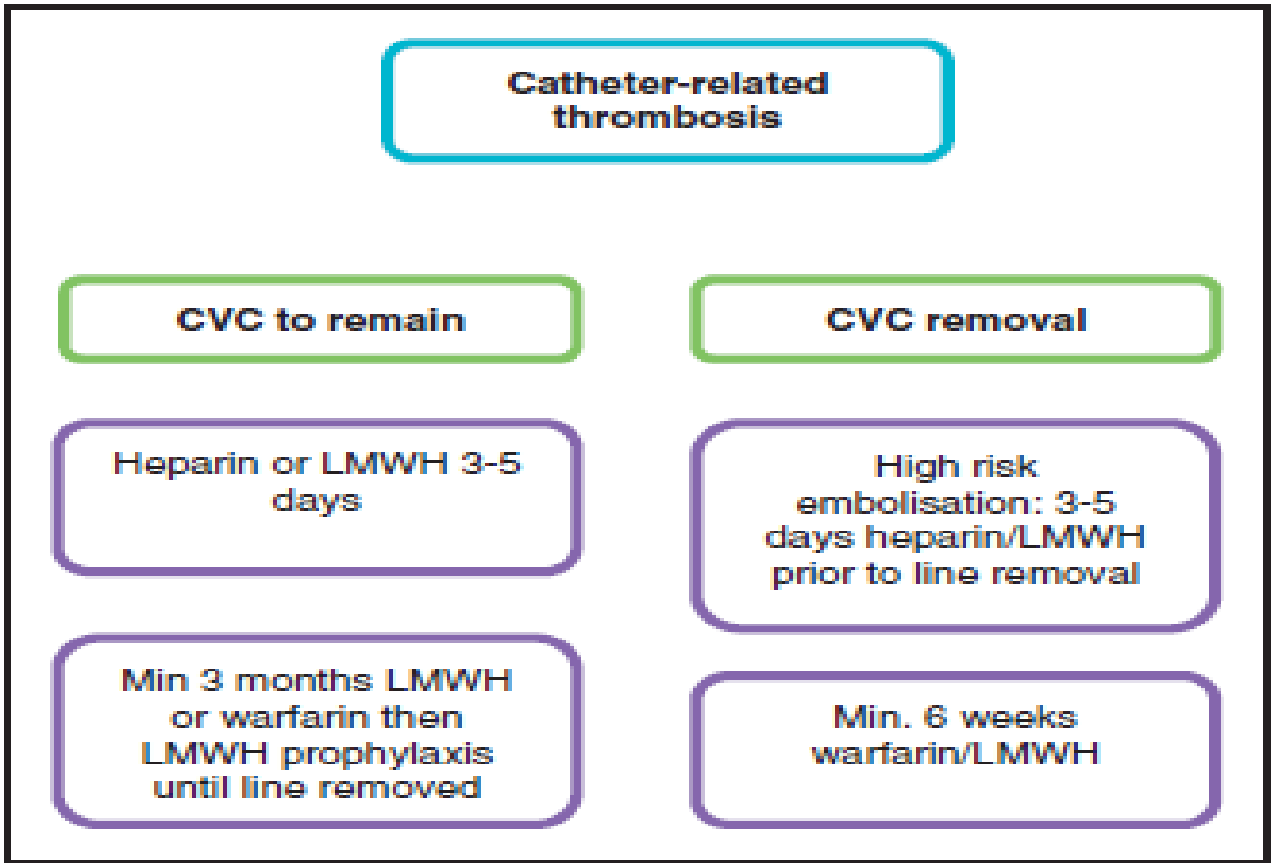


Figure 3. Proposed treatment algorithm for patients with confirmed CRT.
CVC: central venous catheter; LMWH: low-molecular weight heparin.

Prophylaxis

Current guidelines, based on the evidence available,do not recommend anticoagulation for the routine prevention of CRTs

Prevention is better than treatment when it comes to CRT.

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Post procedural hemorrhage

often a complication of the underlying illnessThe port should be left in place if possible; a sucutaneous drain can be inserted if necessary.

The port system can be used again in a few days

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Serious complications

Malposition of the catheter tip in the mediastinum

especially serious complication because it may lead to the entry of infused solutions into the mediastinum or pleural space

Extravasation Injuries

Catheter occlusion, which may be due to a clot within the catheter lumen or to fibrin sheath formation, can be associated with extravasation because excessive force when flushing the catheter can rupture its connection to the septum.

Extravasation of chemotherapy drugs can result in significant tissue damage.

Pain is the main warning sign.

Extravasation Injuries
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COMPLICATIONS

If pain suggests extravasation injury, drug infusion should be discontinued immediately, and the site should be aspirated for residual drug.

In severe cases, tissue necrosis can occur. Depending on the site of extravasation, alteration in limb function and even mediastinal damage may occur.

The degree of tissue injury may be severe enough to necessitate surgical debridement.

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THANKS FOR ATTENTION