PARENTERAL NUTRITION – TYPES OF CENTRAL VENOUS ACCESSES AND PATIENT CARE

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ANNOTATION

Parenteral nutrition is a moderately common treatment for people who are unable to be fed by mouth or for people who have diseases affecting their nutrition provision and needs, hence required to be on parenteral nutrition for long periods.

No short term parenteral nutrition will be dealt with in this article. Focus and emphasis will be placed on long term parenteral nutrition, relevant to patients affected by Crohn's disease, carcinoma of intestine, metabolic complications.

All patients affected by the aforementioned diseases need support and supplementary nutrition. Such patients get familiar with nutrition support therapies at hospitals, where they are educated and advised with the aim to understanding and practicing how to care for and administer parenteral nutrition via central lines autonomously.

Home care agencies provide support to more and more people with the parenteral nutrition needs, however the majority of patients are able to effectively care for their Parenteral Nutrition Access (hereinafter, “PNA”) autonomously.

KEY WORDS: Parenteral nutrition – Central venous access – PICC – Port – Broviac – Home Care – Education – CVA – Patient Care.

INTRODUCTON

In the Czech Republic, approximately 78 683 patients (2015) were supported by parenteral nutrition therapy. Parenteral nutrition is intravenously patients’ feeding with nutrients and supplements their body need, such as vitamins, minerals, carbohydrates, proteins, etc...), bypassing the normal process of feeding by mouth (“per os”). It is not unusual that patients who are able to eat are also supplemented with parenteral nutrition.

INDICATION

Parenteral nutrition (hereinafter, “PN”) is essential where normal feeding is not possible, or enteral feeding is either unsuitable or is contraindicated.

The most common indications for full PN are malnutrition, digestive complications, malabsorption, mental anorexia, organic anorexia, intestinal malabsorption, stenosis on gastrointestinal tract (GIT), ileus, extensive surgery on GIT, intestine inflammations (Crohn`s disease, Ulcerosis colitis), polytrauma, sepsis, peritonitis, head injuries, burns, pancreatitis, liver failure and kidney failure.

The main objective of full parenteral nutrition is for the patient to absorb its necessary nutrient elements in the long period. If the patient is well fed by the parenteral way, he is also well covered against infections.

Parenteral nutrition also helps long term care specialists to stabilize patient’ inner side balance. Nutrition is administered via central lines (CVA) or peripheral lines, depending on the extent the use of the lines is necessary and also on the osmolarity of the infusions. Patients can also be equipped with a special infusion pump enabling the regulation of the speed of the infusion solution.

PN administration can be “full” (all by parenteral way) or as complementary support when the patient is fed by enteral feeding. Moreover, depending on timing of administration, PN can also be short or long term.

Catheter Types

Catheter Type	Access	Placement	Advantages	Disadvantages
Percutaneous nontunneled central catheter	Central	Jugular, femoral, subclavian vessels	Economical, easily removable, can be replaced over guidewire, useful in acute care and short duration therapies	Catheter breakage not repairable, patient self-care difficult, requires sutures to prevent dislodgment, high risk for catheter-related infections
Tunneled cuffed catheters	Central	Percutaneous placement via subclavian or jugular vessels OR; cephalic, jugular vein cutdown	Long-term usage, home care, dressings and sutures can be removed after 1 month, self-care easy, repair kit available	Operating room or specialized room for placement, requires small procedure for removal
Peripherally inserted central catheter (PICC)—nontunneled	Central	Percutaneous placement via a peripheral vein	Used in acute and home care for therapies ranging from several weeks to months, low risk of placement complications, placement occurs anywhere from radiology suite to patient bedside	Blood sampling not always feasible, self-care may be difficult with anticubital placement, extended home care, repair kits may not be available
Implanted ports	Central	Percutaneous venous placement via subclavian, jugular or peripheral vessels	Used for long-term therapies, site care only when accessed, monthly heparin flush, body image intact, no external segment for breakage	Needle access required, needle dislodgment can result in infiltration, placement in operating room or specialized room, surgical procedure for removal

(6)

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Schedule 1: View of Catheters types

CONTRAINDICATIONS

⇒ For the PICC – AV shunt

⇒ Axillar lymphadenectomy

⇒ Venous lumen characterized by an average smaller than 3mm

⇒ Deep venous thrombosis

⇒ Necessary urgent CVA

⇒ Intermittent treatment with the intervals exceeding 1 week

CENTRAL VENOUS ACCESS

Various options are available as far as access for Parental Nutrition is concerned. In the Czech Republic, many patient receiving treatment have a Central Venous Catheter (CVC), Broviac, PICC or Port Catheter.

Catheters are divided into tunnelled or non-tunnelled. Tunnelled cathers are Broviac, PICC and Port.

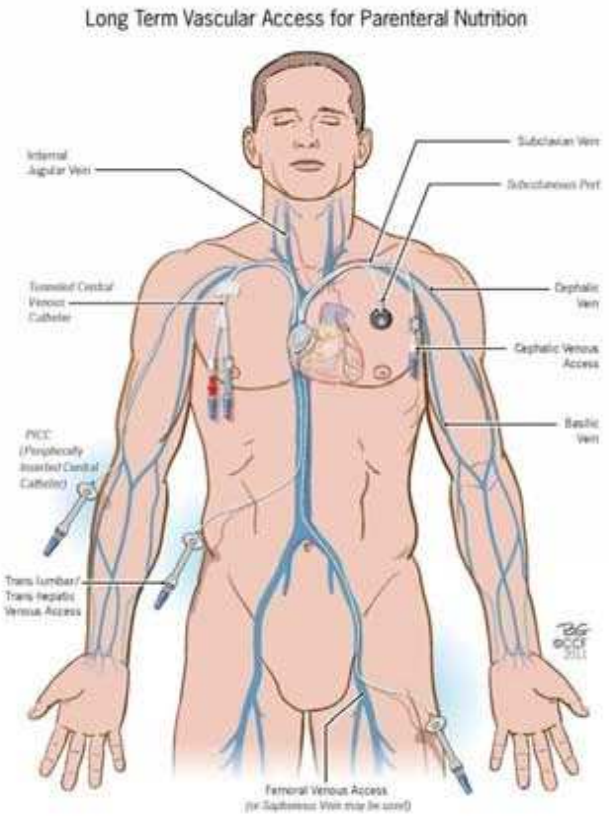

Figure 1: Long Term Vascular Access for Parenteral Nutrition

A **Central Venous Catheter** (CVC) is usually inserted into the right subclavian vein, therefore it may cause several complications, such as higher risk of thromboembolism. For the long term use, special catheters called “tunneled” are inserted. A Dacron cuff may

be used to prevent extraluminal infection and also an accidental displacement of the inserted catheter.

In certain types of catheters, a valve within prevents the blood back flow. The cuff is placed approximately 2 centimeters from the entrance of the catheter on the skin surface and its end is placed in the inferior *vena cava* entering the right atrium, under strict sciascopy control.

On a different note, the Percutaneous Insertion Central Catheter (PICC) is inserted into the *vena brachialis* under the guidance of ultrasonic probe. The end of the catheter is also placed into the *vena cava superior,* same as the CVC. Very good results make unnecessary the use of Heparin medication: it is sufficient clean sterile liquid as Physio or Aqua pro injection solutions. It is not necessary to immobilize the PICC catheter with surgical stiches. This type of catheter can be used in areas of diagnosis such as oncology, intensive care, parenteral nutrition and during the peri-transplantation period.

The **Broviac Catheter** is another type of central venous catheter providing access for parenteral nutrition for periods longer than 2 months.

The **Port Catheter** is a central venous access which is implanted on the skin and has a small chamber through which the Huber needle is punctured (picture 1).

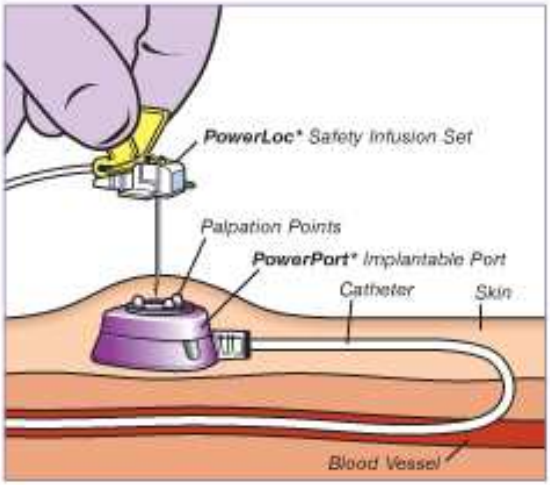

Figure 2: Port catheter with the Huber needle

PATIENT CARE OF CENTRAL VENOUS ACCESS (CVA)

The patient care is indeed very important. The Nurse is the specialist who usually educate and advise the patient on how to autonomously care for and administer parenteral nutrition via central lines. The patient is not released from the hospital until robust knowledge and comprehension of CVA care is achieved. It usually takes 1 or 2 weeks of education.

Strict hygienic standards governing aseptic techniques apply in every manipulation. A Physio solution is necessary to ensure aseptic techniques are effective.

In order to prevent clotting, a central line must be flushed every day applying the START and STOP method 4 times at a minimum (according to this method, Physio Solution flushing creates a vortex in the catheter, perfectly unclutting all sides of the catheter). It is necessary to use 10 or 20ml syringes, smaller ones will not generate enough pressure for properly flushing.

For long term use, special catheters called tunnelled are inserted. A Dacron cuff may be used to prevent extraluminal infection and also an accidental displacement of the inserted catheter.

In certain types of catheters, a valve within prevents the blood back flow. The cuff is placed approximately 2 centimeters from the entrance of the catheter on the skin surface and its end is placed in the inferior *vena cava* entering the right atrium, under strict sciascopy control.

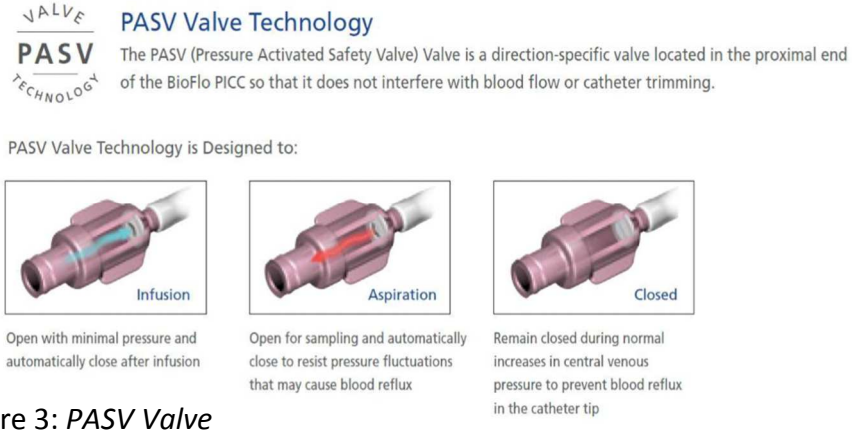

Figure 3: *PASV Valve*

CONCLUSION

Parenteral nutrition is a clinically important therapy which is becoming a common treatment benefiting an increasing number of patients who are able to autonomously care for and administer parenteral nutrition in the privacy of their homes, enjoying a normal life. In the past, parenteral nutrition required hospitalization for weeks or even months. Nurses with the specialization in the parenteral nutrition are capable to educate and train the patient (patient care for each of the CVA, work with the special pump for home or drops infusion set, etc…). Home Parenteral Nutrition Care is not only positively contributing to greater well-being, morale and convenience of the patient, but also promotes economic prosperity and management of the Health System resources, as patients admissions in hospitals for administering PN are declining.

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Picture of Hubert`s needle https://www.nqvascular.com.au/services/vascular-access/portacaths-implantable-device/.

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