

The Use of Permanent Catheters in Chemotherapy

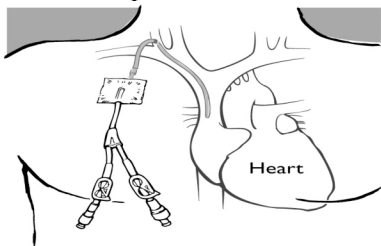
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Cancer causes 13% of all deaths. It all begins with the fight between normal cells and cancer cells. Normal cells divide and grow at a normal controlled rate, whereas cancer cells divide and grow at an abnormal, uncontrolled rate. These cells spread to and destroy vital organs, eventually causing death. Chemotherapy is a method used to stop the spread of, and destroy these cancer cells using drugs.

There are several different ways to administer these drugs. The five most common methods are: intravenous (through an IV), oral (pill, capsule or liquid taken by mouth), intramuscular (injection administered directly into the muscle), intrathecal (administered into spinal cord fluid through a spinal tap), and intraperitoneal (injected into the peritoneal cavity). For now, let's focus on the intravenous method.

Treating patients intravenously can cause several problems, the most common of which being the damage to the patient's veins. Most chemo patients require treatment 3 to 5 times a week for months or even years at a time. The build up of scar tissue as a result of these frequent IV insertions can be detrimental to the patient's veins and can even lead to phlebitis. Another problem that most doctors run into when treating the patient intravenously, is that not all patients have large visible veins. This means the scar tissue will build up even quicker considering there are fewer veins to choose from. Finally, how many people do you know that are terrified of needles? There are quite a few. A simple phobia of needles can cause a lot of stress for both the patient and the doctor considering that getting an IV consists of sticking a needle inside of your vein.

The obvious solution to all of these problems is a permanent catheter that can be used repeatedly for IV injections. Along with receiving chemotherapy and IV fluids through this catheter, patients can receive blood products and even have their blood drawn without painful needle sticks.



Hickman catheter

The insertion of a permanent catheter is simple and goes as follows: A thin, flexible tube is inserted into one of the central veins, usually the external jugular vein. While under general or local anesthesia, the tube is tunneled through surface skin tissue between the neck and shoulder to another separate incision, usually on the chest or stomach wall. The entrance site will have stitches and a small bandage to facilitate healing.

After this procedure it is essential that the patient keeps the exit site for the catheter clean and changes his/her dressings regularly to prevent infection. Also, to prevent blockage of the catheter due to blood clotting, it is normal for the patient to undergo frequent heparin flushes. This is a simple procedure consisting of cleaning out the device with an anti-clotting agent.

Even though these are “permanent” catheters, they are removed as soon as the patient has completed chemotherapy (Permanent simply refers to the fact that they can be used long term). To remove the catheter, the doctor pulls the external portion of the catheter straight down in a series of gentle tugs. However, surgical removal may be necessary to prevent breaking the catheter if the catheter does not dislodge easily with traction.

Permanent catheters greatly reduce the risks involved in frequent IV insertions. However, they do have some risks of their own which include: infection at the exit site, catheter blockage due to a blood clot, a blood clot could form at the end of the catheter causing thrombosis, or the catheter could break.

References:

<http://www.oncolink.com/treatment/article.cfm?c=2&s=9&id=56>

<http://en.wikipedia.org/wiki/Cancer>

<http://www.bardaccess.com>

<http://www.cancerhelp.org>