CORRESPONDENCE

Central Venous Port Systems as an Integral Part of Chemotherapy

by Dr. med. Ulf Teichgräber, Dr. med. Robert Pfitzmann und Dr. med. Herbert A.F. Hofmann in volume 9/2011

Ports Made From Synthetic Materials Are Poorly Visible on X-ray Films

We have some additional comments on the review by Teichgräber et al., regarding late complications after implantation of central venous port systems (1): in the context of caring for patients with port systems, catheter-related complications such as dislocation, leakage, or thrombosis mostly remain clinically inapparent, but they can be diagnosed by using conventional radiography of the thorax (2, 3).

Thus far unpublished data from a retrospective analysis of chest radiographs in our university hospital from 2007–2009 showed that 1190 port systems were implanted, primarily into cancer patients. Altogether 19 different models were used. We found that in 12% of port systems used, the port chamber and the catheter were barely visible or remained completely undetected on radiological investigation because of the materials they were made from. Catheter related complications were identified in 104 (9%) port systems. In three cases of catheter leakage or catheter embolism, it took a very long time to diagnose the problem radiologically because the port systems had not been detected on the thoracic x-ray film.

For this reason, only port systems made from radiopaque materials should be used, to enable sufficiently exact assessment after conventional chest radiography.

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The authors declare that no conflict of interest exists.

Patient Information Is Lacking

The authors of the article mention high-pressure port systems and normal-pressure port systems, but they do not provide any further detail.

With regard to patient information in clinical practice, the information on which port system was implanted is never available, and this means that manufacturers' recommendations regarding flushing are also lacking. The authors wrote that flushing the catheter regularly with heparin is the subject of scientific controversy, but they do not make it sufficiently clear that if the manufacturers' instructions (which are not available) make this obligatory then it is still required.

I did not understand the instructions on how to flush with heparin (10–100 IU heparin/mL, in 0.9% saline solution). Furthermore, the article does not contain any details on whether drawing blood through the port is permissible; if blood can be taken via the port system then I think much clearer instructions are needed on how to perform the required flushing.

In conclusion: the review article provided interesting information on aspects of different port systems but no instructions on how to handle such systems in outpatients.

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Suggested Consensus

Unfortunately, the authors are all experienced in implanting port systems but not one of them actually uses them. This is particularly noticeable from a regrettable absence of answers to questions of daily relevance and from approaches that were are handled very heterogeneously.

Two examples:

- The proposal to flush an occluded port catheter with 5 mL heparin solution – without applying pressure – is well-meant, but in that case the port is not likely to be occluded. Even 1 mL urokinase solution would be impossible to apply without pressure in such a scenario.
- We know that the evidence on how to care for and to flush port systems is scarce. The authors write: "…Controversy surrounds … regular flushing of

the port catheter with heparin solution … The manufacturers of port systems recommend flushing the system after each use with heparin in normal saline in concentrations ranging from 10 to 100 IU/mL … Current studies do not support the notion that port systems need regular puncturing, flushing, and heparin flushing in the interval between treatments … .” So what are we to make of this? How should we flush and what should we use to flush after a therapeutic application? How should we assess What about the risk of heparin induced thrombocytopenia (HIT) when using heparins? How often should a port be flushed when it is not in use – for example, during a therapeutic interval? And what should be used to flush it? What is the evidence for the expensive recommendation to only use sterile gloves?

The authors leave us “end users” quite alone here. I recommend that a consensus on the recommended approach should be reached through our professional society, the German Society of Hematology and Oncology (Deutsche Gesellschaft für Hämatologie und Onkologie, DGHO).

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Huber Cannula Releases Silicone Particles From Port

The article purports to present the most important studies on complications in port catheter systems from the past 10 years. This may be the reason for the error when the authors write that Huber needles, which are used for puncture through the port system’s silicone membrane, are non-punching. As early as in 1988, Haindl and Müller (1) as well as Müller and Zierski (2) were able to show that the Huber cannula, which was developed in the 1950s, releases silicone particles from the port septum. These particles pose a problem not only for port systems themselves, but also for patients as they may be able to reach their circulatory system.

Our own studies into standard port cannulas, Huber cannulas, and punch-free cannulas showed that in 100 punctures with a Shore hardness of 80, large particles were punched by standard port cannulas, small particles by the Huber cannula, and 0 particles when using punch-free cannulas.

Alternatives to the Huber cannula are available. The critical lower end of the Huber bevel has been modified to decreased sharpness (3). Other manufacturers have provided styles to protect the needle tip, for instance by using a mandrin, which is effective but costly. Another solution is a non-bending needle tip with a lateral orifice as found in punch-free needles. This is 100% effective in preventing punch defects regardless of Shore strength.

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In Reply:

Using special port cannulas is essential for infusions through port systems. In general port cannulas have a Huber tip, which is mostly regarded as punch-free. These standard port cannulas have been used in routine clinical practice for more than 20 years and are associated with very few complications. New developments such as port needles with trocar tips with a side opening make punching out silicone particles from the port membrane during puncture unlikely. However, this is currently a niche product from a small manufacturer, which has not yet become widely accepted.

Meaningful randomized controlled studies that justify regular flushing of port systems with heparin in general for all patients who have had a port implanted as a means of preventing port catheter thrombosis have thus far not been published. The risk of developing heparin induced thrombocytopenia exists in principle. In our clinical practice we do not use so called “heparin blocks,” and we flush exclusively with 10 mL 0.9% saline. No evidence exists for regular flushing of port systems during therapeutic intervals.

If the port catheter lumen is occluded any flushing should avoid applying pressure, in order to avoid rupture of the port catheter or damage to the port capsule. Connecting a three-way stopcock on the port needle enables producing suction in the occluded port catheter by aspiration with a syringe. A second syringe filled with urokinase or recombinant tissue plasmonigen activator (rtPA) can be used to attempt lysis as a result of the