Dear Friend,

We live in a fast paced global society where coordinating schedules and organizing face to face meetings are often difficult, but there is always time to acknowledge you, our customer and friend.

It is with sincere appreciation that we say ..........

“Thank-You” for your confidence and loyalty in our products as we extend to you and your families, our best wishes for a year of health, happiness and achievement. May prosperity and success be the two sides of the coin for this year and always.

2012 marks the 31st anniversary of Access Technologies and the 17th anniversary of our TipS Newsletter. Over the years, we have tried to stay true to our mission of providing practical information on infusion.

We are headed into the new year with enthusiasm, eager to introduce to you, our new port, the Swirl. In addition, 2013 will see the release of a long awaited taper polyurethane catheter and a complete range of rat and mouse catheters that will help you in your research.

It has been our pleasure to work with you and we look forward to our continued association.

Cheers,
Pam & all your friends at Access Technologies
2012 HAS BEEN A BUSY YEAR........

• We’ve updated our website - www.norfolkaccess.com
  I urge you to visit and let us know what you think. Your comments are always important to us.

• Our new 2012 catalog is available.
  It includes our new plastic ClearPort series, the innovative SwirlPort (in 2 sizes) as well as our new rodent (rat and mouse) catheter selection.
  Call 1-847-674-7131- for your hard copy or the PDF version.

• Our recently introduced “One Size Doesn’t Fit All” rodent catheter validation program that offers “off the shelf” rat and mouse catheters, for a variety of access targets is proving very popular. If you implant rodent catheters you might find the program interesting. Call for details and to enroll.

GOOD READS you may have missed

4 Dümichen et. al. “Randomized controlled trial of taurolidine citrate versus heparin as catheter lock solution in paediatric patients with haematological malignancies.” J Hosp Infect. 80:304-309. 2012
6 O’Farrell, L. Optimal central venous catheter design for long-term blood sampling in rats. Submitted in partial fulfillment of the requirements for the Degree of Master of Science, Pennsylvania State University, Hershey, PA, USA.
7 Vemulapalli, T. H., & Fredenburg, N. J. “Evaluation of catheter tip configuration and lock solutions in a rat jugular vein catheterization model.” 58th American Association for Laboratory Animal Science Meeting; Charlotte, NC.

VASCULAR ACCESS

....is it still important?

Yes, the ability to infuse compounds into the vascular system and collect blood remains at the core of many research protocols. Infusion and vascular access are a marriage of necessity; you can’t have one without the other!

While catheter performance is dependant on a number of variables including: the catheter material itself, the geometry of the catheter tip, the catheter tip location in the circulatory system, and the experience of the surgeon; the catheter lock solution, maintenance regime, and experience of technicians who access and maintain the catheter play a role that is less often considered.

I recently came across a paper by Barazza et. al. in which proposals for improvement in catheter design, catheter placement and catheter maintenance were discussed. The design and placement improvements proposed were a round tip, large vessel cannulation etc. to limit the physical irritation of the endothelium by the catheter tip and so improve catheter patency. In addition to the catheter design and placement modifications, they recommended improved catheter maintenance regimes that would result in the reduction of persistent bacterial infections and biofilms associated with intravascular devices and loss of patency. An anti-coagulant to replace heparin, given its potential to form immune complexes and enhance platelet activation, was worthy of investigation.

Is the success of Taurolidine Citrate (TCS) over traditional heparin locks related to the fact that heparin itself may promote biofilm production? Shank et. al. suggested that the choice of lock solution is likely to have a significant effect on the ability of bacteria to adhere to surfaces. Specifically that sodium citrate inhibits and heparin enhances biofilm formation on materials used in the manufacture of indwelling dialysis catheters. The anticoagulant component of TCS is sodium citrate!

is it possible that the heparin that flows through catheters is a risk factor for increased biofilm formation?

A paper by Dümichen investigated whether a lock solution containing Taurolidine and Citrate could potentially disrupt bacterial surface adherence and consecutive biofilm production due to the anti-adherence properties of taurolidine and the anticoagulant and chelator activities of both compounds. The results confirmed what we have long suspected; that bacterial colonization was not observed in catheters locked immediately with TCS. Taurolidine Citrate appears to inhibit biofilm formation but not eradicate it. To learn more about our TCS lock solution or to receive a sample vial give me a call and I will be happy to send it.

Pam
The Mechanical Properties of the catheter itself that contribute to long-term patency include; catheter diameter, the distal tip configuration, material hardness and the surface texture. The stiffer the catheter, the more traumatic it will be to the intimal lining of the vessel, eliciting a more aggressive thrombogenic response. Additionally, it has been proven that the catheter tip configuration has an effect on the thrombogenic response with rounded tip catheters remaining patent longer than square or bevel cut catheters.\textsuperscript{6,7}

This makes perfect sense when you consider the physiology of thrombogenicity or thrombus formation. Of primary importance in the process is the interaction of the catheter tip and the intimal lining of the vessel. This innermost layer, the tunica intima is composed of a single layer of endothelial cells that cannot help but be impacted and damaged by the insertion, advancement and indwelling of a catheter.

Forauer and Theoharis\textsuperscript{5} studied the impact of catheters on vein walls in swine and found an inflammatory response at site where the catheter entered the vein. The walls along the course of the catheter from the jugular site to the vena cava exhibited focal areas of intimal injury. It appears that when the catheter tip impinges on the vessel wall, the intima is disrupted, and an inflammatory response is initiated. With a rougher intimal surface available for platelet aggregation a thrombus can occur. Therefore the ideal position of the catheter is when it lies parallel to the vessel with the tip ‘floating’ in the center of the vessel.

Vessel diameter or size also plays an important role in patency. Catheters are much more likely to have direct contact with the intima in a smaller caliber vessel than in a larger vessel. (Fig. 1)

Note that in the smaller diameter vessel, the catheter takes up a larger percentage of the area compared with the space occupied by the catheter in the larger vessel. The catheter in the larger vessel is less likely to result in stasis of flow and is the same catheter in the smaller vessel. Remember, Stasis of Flow is one of the three broad categories of factors in Virchow Triad that are thought to contribute to thrombosis.

**Catheter Size...Bigger is Not always Better!!!**
The Access Technologies next generation of ports represents a focus on the future, of improving reliability and reducing complications by changing the design of the port chamber, reducing the volume while providing an enlarged and radiused septum.

**WHY the need for change...** it is well documented in the literature that the dead space in the port chamber retains thrombosed blood and drug residuals known as SLUDGE that builds up over time, like a sand castle, and may occlude the port. Yes, the withdrawal occlusion you see is likely the result of the needle eye being buried in the sludge!! (fig. 2)

The three places where sludge can build-up is; in the corners where the septum joins the base, in the corners of the base and, where the catheter enters the port.

It was in response to results of data presented by Lawson¹ and Fraschini² in the early 1990’s suggesting a strong correlation between the presence of sludge in the port reservoir and the incidence of occlusions and infections, that led our parent company, Norfolk Medical to redesign the chamber of a port. The result was the Vortex™, a human model, and the ClearPort™, for research and clinical veterinary use. The authors likened the sludge to a ball valve, occluding the needle on aspiration but not during infusion; showing that the sign of the port chamber does influence patency.

**Because Port Chamber Design is still important** we have taken the port chamber design a step further with our new SwirlPort, to introduce a port with a spherical chamber, a small dead space volume and an enlarged radiused septum. With a spherical flow pattern, no corners for sludge to accumulate and a tangential catheter outlet, the SwirlPort ensures complete flushing and has the lowest chamber flushing volume of any port on the market. (See Clearance Poster enclosed for complete details)

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² Fraschini G. Promotion of VAD’s using declotting agents. JVAN 3(1):19-20 1993