

Virtual Nutrition Team (VNT) Guidance

your questions answered

**Prepping line
for an infusion -
TauroLock™
& PosiFlush™**



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Prepping line for an infusion - TauroLock™ & PosiFlush™

Response to question to VNT

Question:

"I'm aware that some people are trained to withdraw a set amount of blood before prepping their line for an infusion after it's been locked with TauroLock™.

1. What should or should not be withdrawn from the line?

2. Any reason why flushing with PosiFlush™ 10ml sodium flushes would bring on severe cough and breathlessness, face going red, fingers tingling, vomiting then retching for no reason and generally feeling weak and faint?"

Answer:

We have had some very useful and precise answers from VNT members. Firstly, let us deal with the TauroLock™ question.



TauroLock™

This was an innovative product which came into use in the 1990's when the late Professor Chris Pennington, Consultant Physician and Gastroenterologist, Dundee used it successfully in patients with recurrent line infections on parenteral nutrition (PN). Although there are three preparations bearing the

TauroLock™ name (TauroLock™ Heparin, TauroLock™ U2500 and simple TauroLock™), the one most commonly used in the UK is TauroLock™ containing Taurolidine and citrate 4%. The taurolidine is metabolised (changed) to taurine very rapidly in the body. Taurine is a non-essential amino acid which we all have in our blood streams after protein meals. Some PN solutions also contain a little.

Taurolidine has a highly effective broad spectrum antibacterial and fungal effect, even against resistant bugs such as MRSA or vancomycin resistant bacteria. Citrate 4% is a useful additive in that it helps prevent thrombosis occurring in the tip of the intravenous catheter by binding with calcium thus preventing calcium and fibrin getting together to form a clot. Occlusion of PN lines can occur in the absence of local

line infection but is much more likely if infection is present. Thus, prevention of both infection and clotting with TauroLock™ is a very attractive proposition in those few patients who have repeated line infections leading to catheter related blood stream infections (CRBSI). TauroLock™ is NOT a panacea for poor aseptic technique. It is also used in haemodialysis and oncology to prevent catheter blockage and infection.

In the UK, its use is generally restricted in PN to those on home parenteral nutrition (HPN) with recurrent infections - often despite apparently good aseptic technique. One Scottish VNT member uses it in adult patients as a line lock after 3 infections in one year. Our paediatric expert advises use of TauroLock™ after only one line infection and has found it extremely efficacious and cost effective. It is not unusual to be unable to aspirate from the child's line so flushing is normally practiced albeit with some noticing abnormal taste or nausea. This can usually be avoided by flushing more slowly. The St. Mark's Intestinal Failure Unit published a small study of patients who had suffered a total of 28 CRBSIs (0.85/100 catheter days) over the previous two years. After introduction of TauroLock™, the infection rate fell significantly to only 8 (0.16/100 catheter days). They also noted several side effects similar to those mentioned in our question – disturbed taste and tingling around the mouth.

Side effects of TauroLock™ are infrequent but a metallic taste after flushing it through, together with tingling fingers or around the mouth are relatively common. These are thought to be due to citrate which lowers blood calcium transiently to cause the symptoms. It is unlikely that taurolidine itself causes any significant reactions as it is altered to the naturally occurring amino acid taurine very rapidly once in the blood stream. Infusion of taurine in PN fluids is not associated with side effects.

So what happens when a line is flushed? Firstly, the company producing this drug recommends aspirating the line to remove residual TauroLock™ before refilling the line with more TauroLock™. This is to reduce the chance of TauroLock™ being flushed into the blood stream, although the side effects are not dangerous. Most side effects are probably due to the citrate content which reliably causes such symptoms if given in higher concentrations.

Our VNT correspondents have pointed out that aspiration (drawback) pre TauroLock™ was recommended but in practice, this is not always possible. However, it seems that drawback is still preferred before instilling TauroLock™ as several experts have experienced side effects including septic showers into the circulation when drawback had not been performed before feeding or lock replacement.

The St. Mark's team have taken a slightly different approach. Although they prefer to draw back if possible, they restrict the volume of TauroLock™ instilled as a lock to 1ml only, instead of the 3ml volume in the vial (5ml vials also available). If drawback is performed, similarly, only 1ml is needed to clear the line whose residual volume is around 1ml. As not all patients can draw back reliably, St. Mark's now recommend flushing the line before instilling the TauroLock™. As suggested in our question, this can lead to problems too.

This brings us to the second question concerning the side effects of flushing with PosiFlush saline.

tingling, vomiting then retching for no reason and generally feeling weak and faint”.

One of our expert VNT members reports that some patients describe a transitory unpleasant taste sensation when using the PosiFlush™ syringes which is acknowledged by the manufacturer and believed to be associated with substances leaching from the plastic into the saline. It is not harmful. As a result, some of their patients have elected to draw up their own saline to avoid the side effects of PosiFlush™ whilst another has elected to continue with PosiFlush™ despite the associated nausea and retching.

There have been a few studies describing this and evaluating the frequency (Can J Hosp Pharm. 2012 Sep-Oct; 65(5): 368–372 and BMC Nurs. 2010;9:1–6. doi: 10.1186/1472-6955-9-1). The Canadian group found 73% of their children receiving PosiFlush™ saline injections via their lines experienced taste and odour disturbances. A Norwegian team found similar results in volunteers and identified some volatile substances thought to emanate from the plastic in the syringes. There are no reports of these being toxic but allergic reactions are theoretically possible.

So what happens if PosiFlush™ and TauroLock™ enter the circulation together?

Although this question has not been posed to us, it is reasonable to consider the possibility that as both are used almost simultaneously, that any side effects could be the result of either product. At least one of our respondents takes the pragmatic view that if side effects simulate an allergic reaction it is reasonable to withdraw the TauroLock™. Fortunately, those patients affected seem to have become less liable to line infections perhaps as a result of greater attention to their aseptic technique on withdrawal of TauroLock™ protection.

So in conclusion, the side effects noted by our questioner are well recognised. As always, the balance between benefits and side effects will need careful consideration by the patient together with their HPN team. However, the benefits of TauroLock™ in a small group of patients with a high incidence of CRBSI appears to be most attractive. Avoidance of PosiFlush™ side effects can be dealt with by simply drawing up saline as and when needed in standard syringes.

Dr Barry Jones, PINNT – VNT lead

For further details on the VNT and its members visit:

<http://pinnt.com/About-Us/Virtual-Nutrition-Team-VNT.aspx>



PosiFlush™

PosiFlush™ is a pre-prepared solution of saline which avoids the need for loading a syringe with saline before preparing the line for feeding or for a lock. Our questioner has noted that 10ml PosiFlush™ has been associated with quite unpleasant side effects: “cough and breathlessness, face going red, fingers



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