

Summary – Current Topics in IV Therapy for Hydration & Nutrition October 7, 2011

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Introduction

Mona Inocentes and Deb Pfister from Thrive RX have years of experience working with patients who utilize home infusions. Mona is the Nurse-Coordinator and Deb is the Director of Nutrition. Both work with many Mito patients. Thrive RX is a home infusion company which focuses on nutritional support through both enteral and intravenous means. Many patients with mitochondrial disease have gastrointestinal issues and therefore need various therapies for their nutritional intake. This means that these patients are often battling infections when they already have a weak immune system. A previous talk (August 2011) dealt with some of these "line" issues and today's discussion continues in that vein, describing the various types of infusion therapy. There are slides which accompany this discussion that can be accessed at the MitoAction website.

History

Early IV nutrition consisted of dextrose and protein only. It was not until later that lipids were introduced, but because of complications with the lipids, they were removed from IV nutrition for a while before being reintroduced. It is worthy to note that only 50 years ago TPN was a therapy used only on animals. The last 20 - 30 years have seen great advances in this therapy mode. For many years only glass bottles were used, and for home infusions patients received powder and sterile water and then had to mix up the solutions themselves.

Innovations

Today we have multiple options for nutritional IV therapy. The pump options include CADD, Gemstar, Curlin and Bodyguard 323 to name a few. The tubing/extension options include pump specific tubing filters, Y sites, PICC extensions, and "Curly Tubing."

The Spectrum of Nutritional Support

When considering IV nutritional support, it is best to begin with the simple means and then work your way up. Obtaining nutrients through the oral route or the GI tract is always the first route and the best (oral, by mouth, or enteral, tube feeding into intestinal tract). Why? Because this means of nutritional intake is more physiological. There are nutrients and probiotics in food that we don't know about yet or that we cannot yet provide artificially. There are new discoveries being made every day. So, if possible, the GI route is always better.

There comes a time, however, for some patients when this is no longer possible and that is when intravenous nutritional support is needed. This can take the form of intravenous hydration or home parenteral nutrition. Total parenteral nutrition (TPN)

means providing a person's total caloric needs through a parenteral/intravenous line leading into the central circulatory system.

IV nutrition provides fluid and can be used as a vehicle to provide electrolytes or other additives. Hydration solutions are typically normal saline solution or half normal saline and half D5W (5% Dextrose in water). Some solutions can be quite complicated as other additives are added when required by the patient, and these solutions can be used to administer other nutrients as well. Such solutions are given either peripherally (through a vein in the arm) or directly (centrally) into the heart or veins near the heart.

There are many variables which determine which kind of hydration treatment is best for any individual person. How and where the hydration takes place is a factor as well as how long the procedure will take. A simple saline infusion may only take a few hours while other infusions may take 12 or more hours.

"Parenteral" means by vein (intravenous). Those solutions which carry high nutritional value (calories) are given through central lines, which are called by various names (PortACath, PICC line, Tunnel catheter) and will be discussed later (see also slides accompanying this discussion). Intravenous therapy of any kind can be safe but recommendations for its use are always made with caution because complications can arise and can be significant even when the best techniques are used.

Hydration issues specific to Mito patients

A major issue for both adults and children with mitochondrial disease is hydration. It is sometimes difficult to establish an exact status, so Mito patients should actually document and keep a record of exactly how much fluid they are getting over a period of weeks, then average this out. What may not be regarded as 'clinical dehydration' may in fact be dehydration for a Mito patient. Even just a slight change in hydration status can have devastating effects.

Many Mito patients have dysautonomia, which is accompanied by nausea, so it is hard to maintain enough of a fluid intake and a vicious cycle is established. Nausea is aggravated by decreased hydration but also causes less to be taken in. Mito patients need to recognize this chronic fluid deficit (for whatever the causative reason) and consider hydration as a necessary treatment, which is unique to Mito. Hydration therapy can significantly help reduce Mito symptoms.

The Challenges of Home IV Hydration/Nutrition Reimbursement

Because most intravenous hydration cases are usually short term and intermittent (someone has the flu and cannot eat or has diarrhea for 2-3 days), insurance companies see IV as an ancillary treatment to other treatments. Reimbursement methods, then, follow that strategy and payment is generally very small compared to other IV treatments (ie, for drug administration, etc). The per diem payment from an insurance company, for example, may barely cover the services and some infusion companies may be reluctant to provide IV hydration only because the reimbursement rate is so low. Thrive RX has worked diligently with insurance companies and with employers to negotiate contracts to improve the coverage for people on all kinds of IV

therapies. By talking with and describing the needs of patients to actual insurance company representatives, coverage can be expanded.

It is interesting to note that Medicare does not cover IV hydration; part D of Medicare will cover the drug being given thru IV but not the supplies related to that infusion. Those seeking insurance coverage should inquire of their insurance carrier if they cover IV hydration. Often times, the home infusion company that will administer the infusion can find this information for you. Letters of medical necessity and consultation reports can also be helpful when trying to obtain coverage.

The Decision

The decision to start IV hydration is not an easy one to make. Among the considerations are whether this is to be short term or long term. Often this decision is not clear-cut. A patient may need hydration for only a week or two (supplemental). The type of hydration line is difficult to determine if you don't know the time line. These are all decisions an individual needs to consider with the help of his/her physicians, nurses and other Mito specialists based on the patient's life style and need.

The Kinds of Lines:

Peripheral These are IV lines placed in the hand or arm for short term use (maximum of 3-5days). They are not great for home use because they require a skilled nurse to insert them and maintain them (and fewer and fewer home care nurses have training to do this because more people now have permanent lines). Often these short term infusions are done in the outpatient clinic and when completed, the patient goes home.

PICC Line These are usually in the upper arm and are placed in the hospital with an XRay guiding the placement (the tip of the catheter goes into the central circulation). With a PICC Line, more concentrated solutions can be infused but the site must be protected because of the risk for infections. No swimming - the site cannot get wet and must be protected for bathing/showering.

PortACath This is a line which is surgically placed in the upper chest (usually). This too is a central line and is used for intermittent IV therapy. A needle is placed into a port (Huber needle) for access. The needle can be removed since the site is actually under the skin so when not in use, the patient can swim, bath, shower, etc.

Tunnel catheters These are usually in the upper chest and are placed and removed surgically (like the PortACath). They can on occasion be placed elsewhere so as not to be noticeable. There is limited ability to both swim and bath/shower depending on the particular surgeon who inserts the line. They can be covered with patches, etc but this is individual. There is, as with other lines, the risk of infection and complications.

Mito patients' unique challenges with lines Because Mito patients often have sensitivity and/or allergies to plastic, tape, or other therapy related substances, they suffer from more frequent skin breakdown, and, therefore, are more likely to contract infections.

They also have weaker immune systems, so this adds to the infection risk. There is also an increased risk of clotting among Mito patients, which can also lead to infections and loss of use of the line. Any increased risk of infection is more significant for Mito patients, so all risks need to be minimized as much as possible. The slides which accompany this discussion show a sign (KEEP SAFE) which should be used to remind all hospital personnel about the importance of preventing infections. The precautions are common sense actions, but need to be noted and hospital staff members should be reminded by the patient or patient's advocate. No one should be embarrassed or reluctant to make these recommendations. These requests can be made in a polite manner or the patient can even say, "This is how I care for my line at home, I'd like to do it myself now too. " The fewer hands that touch a line, the better for infection control and prevention.

S - scrupulous hand washing

A - assess and organize operations; separate clean items

F - friction to the hub; always scrub access points with alcohol or tincture of iodine prior to injecting meds, flushing or connecting

E - establish and maintain sterile to sterile pathways

Complications & Treatments of Complications

One major complication of lines is a catheter occlusion, usually caused by blood clots. Sixty (60%) percent of all central line occlusions are due to thrombotic occlusions (blood clots). CathFloActivase (trade name) can be used to clear out this "sticky" clog on the end of the catheter. Patients who have lipids in their solution (TPN) can also have lipid occlusions because this solution can be thick. If TPA doesn't work, then often 3 ml of 70% ethanol can clear the line. For clogs caused by minerals, a 3 ml solution of 0.1N of HCL (hydrochloric acid) works to clear the line.

Infections remain a complication of intravenous lines. Biofilm adds to the increased risk. What is biofilm? This is the sticky component of blood which is a magnet for bacteria to grow on. It sticks to the inside of the catheter. When fluids run through the catheter this film can be cleared - especially when antibiotic solutions are run through. The bacteria which might collect on the sides on this biofilm can be removed or killed. But the biofilm which forms at the bottom (see slides) is not removed and remains a potential area for infection.

Catheter Related Blood Stream Infections (CRSBI) are the biggest threat to intravenous nutrition. The aim of treatment is always to save the line if possible. This can be done in several ways depending on the type of bacteria and how colonized the line is.

Treatment would include:

- Systemic antibiotics
- Antibiotic locks (these are not used as much now due to resistance which has built up against them)
- Removal of or change the central line (this is the last resort)

Changing or removing the line is not something that is done lightly because each new line can cause scarring and you can lose access areas, so taking care to prevent infections is paramount.

Prevention of CRBSI To protect the line, thorough cleaning is essential. The catheter should be scrubbed with alcohol. Solutions of ethanol can be instilled into the catheter and then withdrawn after 2 -12 hours. There are newer caps on the end of catheters that are embedded with alcohol. Antibiotic impregnated catheters are also available as is a "biopatch" which is a chlorhexidine impregnated patch used over the site of the catheter insertion.

Summary Because patients with mitochondrial disease find it more difficult to overcome infections, it is most important for them to prevent infections when using intravenous nutrition. Vigorous line care is imperative and self-advocacy is essential to insure the safest, infection free care. Contact information for Mona and/or Deb at ThriveRx is: info@thrivex.net

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