Proctoclysis: emergency rectal fluid infusion

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Summary

This article describes the use and effectiveness of proctoclysis (rectal fluid infusion) in providing fluid resuscitation in the absence of intravenous access in rural and remote environments.

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EMERGENCY PRE-HOSPITAL treatment of haemorrhage includes immediate fluid replacement therapy, which requires intravenous access, rapid infused intravenous fluids and control of the source of bleeding. The aim is to restore an adequate circulating blood volume and reverse hypotension to perfuse vital organs and reduce the risk of death (National Institute for Clinical Excellence 2004). In remote or rural settings, a lack of sterile fluids, intravenous equipment or the knowledge to use them might limit the options available for fluid replacement therapy. In a pre-hospital emergency situation where clinical intervention is indicated, rectal fluid infusion can provide an easy and effective solution to fluid replacement.

Advent of proctoclysis

At the beginning of the 20th century John Benjamin Murphy, an entrepreneurial American surgeon, introduced the drip method of saline solution via the rectum in the treatment of patients with peritonitis (Rutkow 2001). This infusion technique, known as proctoclysis, or the 'Murphy drip', was used to rehydrate and deliver medication in solution to treat a number of conditions.

With the advent of the first world war, medical developments were required urgently for the management of battlefield injuries. Concerned that blood volume in soldiers recovering from blood loss returned to normal slowly, Robertson and Bock (1919) recognised that fluids introduced via the rectal mucosa could increase the circulating blood volume. The researchers first gave proctoclysis to soldiers who had previously received blood transfusions, but still had a low blood volume. Soldiers were also encouraged to take oral and rectal fluids. As soon as possible after injury, wounded soldiers were given large quantities of water orally, and salt solution via the rectum. In turn, the blood pressure rose progressively and the circulating volume increased. These changes were often apparent after only two or three hours of treatment, with the patient retaining up to 500ml of saline solution per hour (Robertson and Bock 1919).

The use of rectal fluid infusion was more popular in times when intravenous therapy techniques were less advanced. Understandably, the use of proctoclysis was to decline with the widespread use of intravenous techniques. Nurses and doctors became skilled at cannulation and using intravenous equipment and had little need for a less efficient route of fluid administration (Foëx *et al* 2007). Proctoclysis is still used today, for example in Chinese medicine, to introduce herbal medication for the treatment of prostatitis (Chen and Hu 2006).

Proctoclysis

With the widespread use of intravenous infusions, some might question whether there is a place in contemporary emergency nursing for proctoclysis. It is generally accepted that intravenous fluid replacement should always be attempted first in patients with haemorrhage. There are other fluid administration routes, including subcutaneous, intraosseous or intraperitoneal routes, but these

require expertise and specialised equipment. In contrast, rectal fluid infusion does not require sterile fluids, special equipment or complex training (Girisgin *et al* 2006). Therefore, in certain cases where alternative infusion routes are not readily available, proctoclysis may be useful.

The equipment required for emergency proctoclysis is listed in Box 1 and the procedure is outlined in Box 2.

In a contemporary account of the use of proctoclysis for fluid resuscitation in a remote environment, Grocott *et al* (2005) described the case of a 21-year-old Nepalese male with a three-day history of haematemesis (vomiting blood). When his first episode of haematemesis occurred, a trekking group administered 500ml of intravenous fluid. Grocott *et al* (2005) encountered him two days later when he was noted to have continued haematemesis. He had also passed 'black stool' on several occasions. The man was drowsy and in pain. His respiratory rate was 32 breaths per minute, his carotid pulse rate was 127 beats per minute (bpm) and he had peripheral vasoconstriction with non-palpable radial pulses. The patient was diagnosed as having haemorrhagic shock secondary to a major upper gastrointestinal bleed.

Consent for rectal fluid administration was attempted via a translator, but this process was complicated by the patient's reduced level of consciousness. To permit rectal fluid administration a size 14 Foley urinary catheter was taped to a sterile glove, which had one of the fingers cut off to act as a funnel. The catheter was inserted about 10cm into the rectum, the balloon was inflated and the catheter withdrawn until the balloon came under gentle tension against the rectum. A solution of oral rehydration salts, made up with boiled water and cooled to body temperature, was administered via the Foley catheter. One litre of double-strength solution was followed by two litres of standard-strength solution over three hours. A small amount of fluid leaked externally. A further two litres of standard-strength solution were given orally over the next 12 hours.

After the patient was resuscitated with rectal fluid his clinical condition improved and he became alert and more comfortable. His carotid pulse rate decreased to 95bpm and his radial pulses became palpable. The individual passed urine four hours after fluid resuscitation was started. The patient was transferred on foot, then by aeroplane to a hospital where his haemoglobin was found to be 2.2 g/dl and he was given eight units of blood and intravenous fluids. Grocott *et al* (2005) reported that the patient was unlikely to have survived without the significant improvement in his condition as a result of proctoclysis.

Proctoclysis received little attention in the hospital setting since the advent of effective intravenous techniques. However, the technique has been rediscovered in palliative medicine. In a study by Bruera *et al* (1994), it was

BOX 1

Equipment required for proctoclysis

- Soap and water or alcohol gel (if available).
- Gloves (if available).
- Large gauge Foley catheter of 14 Charrière or more.
- 10ml syringe.
- 10-30ml boiled and cooled water or sterile ampoules (if available).
- 50ml syringe, glove or other reservoir.
- Rehydrating solution (Dioralyte™ or similar) or salt water.
- Tap or bottled water or water from a local source, for example a river.

BOX 2

Procedure for administering emergency proctoclysis

- Explain the procedure to the patient and gain informed consent (if possible).
- Filter and boil water if taken from a river or lake to avoid infection or an allergic reaction.
- Warm water to as near to body temperature as possible to promote comfort and to reduce the risk of hypothermia.
- Dissolve sufficient rehydrating solution into warmed water.
- Maintain dignity and privacy by screening the area or patient.
- Ask or assist the patient to lower clothing below the waist.
- Ask or assist the patient to lie in the left lateral position.
- Wash hands with soap and water or use alcohol gel. Dry hands thoroughly.
- Wear protective gloves (if available).
- Draw up sterile water to inflate the catheter balloon with a 10ml syringe.
- Insert the Foley catheter 10-20cm into the rectal canal.
- Inflate the catheter balloon with the correct amount of sterile water.
- Tape the part of the glove where the finger has been removed, or attach a 50ml syringe (with the plunger removed), to the catheter. These items will act as a fluid reservoir.
- Hold the reservoir with the non-dominant hand.
- Pour warmed rehydrating solution into the reservoir using the other hand.
- Where possible, suspend the reservoir on a stand or tape to a post secured in the ground, which is in a higher position than the patient.
- The patient should be positioned in a manner that is comfortable to promote compliance with the procedure.
- Monitor clinical signs and adjust rectal fluid infusion to maintain heart rate, respiratory rate and urine output.
- Co-ordinate ongoing transport as soon as possible.
- Liaise with the receiving hospital about the need for intravenous access, fluids or blood.

(Adapted from Grocott *et al* 2005)

demonstrated that proctoclysis with tap water or 0.9% sodium chloride at rates of between 100-400ml per hour was a safe, effective and low-cost technique for delivering hydrating fluids for two weeks or more in terminally ill cancer patients. In this study, 78 patients received either tap water or 0.9% sodium chloride via a nasogastric tube inserted 40cm into the rectum. Four patients declined to continue treatment because of discomfort, and nine experienced an enema effect (bowel movement as a result of the fluid infusion). In most patients, hydration was well maintained and there were no reported side effects or complications (Bruera *et al* 1994).

Remote and emergency care

In a situation where intravenous fluids are not feasible and clinical intervention is indicated, a rectal fluid infusion is straightforward to set up and can be easily supervised. It is unlikely the procedure will cause an infection and pre-packed sterile infusion fluids, which can be expensive and heavy, are not required (Chambers 1976). In addition to the minimal costs involved, someone who lacks sufficient intravenous training or knowledge can carry out the procedure.

Absorption of the 0.9% sodium chloride solution through the rectum can be sufficient to restore blood volume progressively until which time the patient can be transported to the hospital. It can therefore be used in a wide variety of emergency situations and is of particular benefit in remote medicine (Girisgin *et al* 2006). Steiner and Bruera (1998) suggested that proctoclysis may provide an ideal solution for nurses working in developing countries or rural areas where there is little access to hospital care, or where sterile cannulae, fluids and giving sets are expensive. Rectal fluid infusion could be useful in mass casualty situations where the medical team needs to administer fluid resuscitation, but has insufficient intravenous equipment or nursing staff.

The primary aim of proctoclysis in an emergency situation is to provide initial fluid resuscitation in advance of rapid evacuation for further care in a dedicated medical facility (Grocott *et al* 2005). Once effective intravenous access has been established, rectal fluid infusion should be discontinued (Girisgin *et al* 2006).

Consent and compliance

Despite the life-saving properties of proctoclysis in the absence of alternative treatments, there are cultural issues that might lead to a patient declining this particular intervention (Bruera *et al* 1994). A conscious and alert patient may find it difficult to understand that infusing fluids by this route can be effective and it might also be unacceptable to them.

There are occasions when rectal saline is returned (Bailey 1938). The physiology of the rectum does not allow for a complete seal around the rectal infusion tubing. This enables flatus to escape, and on rare occasions there has been an enema effect. For these reasons the patient may not wish to commence or continue rectal infusion.

Conclusion

Emergency pre-hospital treatment of haemorrhage requires immediate fluid replacement therapy. In remote or rural settings, the lack of sterile fluids, intravenous equipment or the knowledge to use them might limit the treatment options available.

First world war medical researchers investigating haemorrhage caused by battlefield injuries found that circulating volume could be increased after only two or three hours using rectal saline infusion. In a rural or remote situation, proctoclysis remains an easy and effective way to provide fluid replacement. It does not require sterile fluids, special equipment or complex training, and it is useful when alternative routes are not readily available **NS**

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