Intestinal Malrotation and Volvulus in Children

What is intestinal Malrotation?
Malrotation describes an abnormal arrangement of the bowel which happens while the baby is developing in the womb.

Our digestive tract consists of the food pipe (‘oesophagus’), stomach, large and small bowel and rectum. During pregnancy, the baby’s digestive tract is formed during the 4th and 12th weeks of fetal life. The digestive tract starts off as a straight tube leading from the stomach to the rectum. During development within the womb the digestive tract is initially located in the foetus’ abdomen but for a while part of it moves into the umbilical cord where it develops into the large and small bowel. At about the 10th week of pregnancy the intestine moves back again, from the umbilical cord and back into the abdomen. After returning to the abdomen the intestine makes two turns (‘rotations’). Malrotation occurs when the intestine does not make these turns as it should.

![Diagram of normal digestive tract and malrotation](image)

The digestive tract lying in its normal position

An example of how the bowel may be positioned in Malrotation

How is a Malrotation prevented?
There is no way to prevent Malrotation; nothing the mother did or did not do, during pregnancy is known to cause Malrotation.
What is a Volvulus?

When the bowel is in normal rotation and fixation it has plenty of room to function normally. In children with Malrotation the bowel can twist abnormally. Volvulus is a complication of Malrotation, whereby the bowel twists, causing a blockage within the bowel and possibly cutting off the blood supply to part of the bowel.

Are there any other complications of Malrotation?

Bands of tissue (called ‘Ladd’s bands’) can also form as a complication of Malrotation. Ladd’s bands can also cause obstruction (blockage) within the bowel.

OBSTRUCTION CAUSED BY VOLVULUS IS A LIFE THREATENING PROBLEM. The intestine can stop functioning and intestinal tissue can die from lack of blood supply to it.

What causes Malrotation and Volvulus?

We do not know why some children get Malrotation and Volvulus. Girls and boys are affected in equal numbers.

What are the symptoms of Malrotation and Volvulus?

Malrotation may not have any symptoms. Some children are only found to have Malrotation as an ‘incidental finding’ that is, whilst they were being investigated for something else. However many children develop symptoms during the first months of life and the majority are diagnosed by the age of one year.

A volvulus may be the first sign of a Malrotation. Symptoms of a volvulus or blockage can include some or all of the following:

- Vomiting; which becomes green (bilious).
- Abdominal pain which may appear to be colicky or crampy. Infants may demonstrate this by pulling their legs up, crying and then having a short period of time (15 to 30 minutes) of behaving normally but then having signs of pain again.
- Infants may be irritable, have inconsolable crying or be lethargic.
- The child abdomen may appear swollen (called abdominal distension) and be tender to touch.
- Children and infants may have a pale complexion with an increased heart and breathing rate.
- Children may pass less urine.
- Your child may pass diarrhoea or may pass less faeces (poo) or stop passing faeces.

How is a Malrotation or volvulus diagnosed?

Malrotation and volvulus are usually diagnosed with a type of x-ray called a ‘contrast study’. A contrast study involves the child receiving some fluid (called contrast medium) which shows up on x-rays so helps the doctors to see where the twist or blockage is.
Some children will drink the contrast in liquid form but others, who are already unwell with symptoms, need to have a tube called a ‘nasogastric tube’ passed through their nose and down into the stomach through which the contrast is then given.

**How is a volvulus and Malrotation treated?**

If your child is found to have a Malrotation without a volvulus, your doctor will discuss options with you. It may be recommended that your child has a planned operation to correct the Malrotation; or a period of observation with regular check-ups may be suggested. However complications from Malrotation, including volvulus, can occur at any time in which case an emergency operation will then be required.

A volvulus requires an emergency operation. Whilst the bowel is twisted, food and fluid cannot move along and therefore dehydration occurs because fluids cannot be absorbed properly. If not operated on quickly, the twisted part of the intestine can die from a lack of blood supply; this can lead to a condition called short bowel syndrome where a child cannot absorb their food adequately and has to rely on nutrition through a drip. Some infants with twisted bowel (volvulus) also become very sick due to the bowel not having enough blood supply and sadly not all children will survive this condition.

Occasionally, when a child is very unwell, it is necessary to perform an emergency operation without first obtaining a definite diagnosis (for example when a child is too unwell to have the contrast study) as it is important to operate quickly to prevent risks to the bowel or the child’s life.

**What happens during the operation?**

**A planned procedure to correct Malrotation:**
The operation is called a Ladd’s procedure. During the operation your surgeon will straighten out the bowel, they will then check the bowel for any unhealthy areas before returning it in a safe position back in the abdomen. Sometimes the surgeon will also remove the appendix during the operation. This is because the appendix lies on the wrong side of the abdomen in Malrotation and may cause difficulties diagnosing appendicitis in the future.

**An emergency procedure to correct volvulus:**
Before emergency surgery is performed your child will be given fluids through a drip and will have a tube called a ‘nasogastric tube’ passed. The nasogastric tube is passed via the nose, down the food pipe and into the stomach in order to drain the stomach of trapped fluid and air.

The surgery itself is called a ‘laparotomy’. The surgeon will make a cut across your child’s abdomen, locate and then unwind the twisted bowel. If the bowel then all looks pink in colour a ‘Ladd’s procedure’ will be performed (that is, the bowel is re positioned into a safe position). The appendix may also be removed. The surgeon will carefully check the bowel for any unhealthy areas (areas that are not pink in colour) which may need to be removed.
Usually, when an area of unhealthy bowel needs to be removed, the bowel can be joined up again at the same time but sometimes a stoma may need to be formed. Forming a stoma involves bringing a small section of bowel out onto the skin so that faeces (poo) are then passed into a bag.

The requirement for stoma formation is uncommon and, in most cases, the stoma can be closed again a few months later. Your surgeon will discuss this in detail before the operation.

**What happens immediately after the operation?**

If your child has had a planned correction of their Malrotation (Ladd’s procedure); you will be able to be with your child as soon as they begin to wake in the recovery room. You will be provided with a device called a ‘pager’ which will beep when your child is in the recovery area and awake. Once your child has fully woken (s)he will be taken back to the ward. Very occasionally children (for example some children with known chest or neurological problems) will need to be monitored in the high dependency unit before then being transferred back to the ward.

If your child has had an emergency operation due to volvulus or Ladd’s band adhesions it will usually be necessary for your child to be cared for in the Intensive Care Unit so they can be more closely monitored. You will be able to be with your child once they have been transferred to the intensive care unit.

**Will my child be in a lot of pain after the operation?**

We do not want your child to be in pain so medicines to help control any pain they have are given during the operation and after it. Your nurse will assess your child’s pain regularly and ask you to help with this as you know your child best and how they usually show pain.

At the end of the operation pain killers may be given as local anaesthetic, through a drip or as a suppository. On the ward children may have their painkillers via a drip but once your child starts drinking; medicine can be given orally again.

**How long will my child stay in hospital for and can I stay with him/her?**

The length of stay will depend on each individual child. Children who have had a planned operation for Malrotation are usually in hospital for three to five days but those that have had emergency surgery will be in hospital for longer; the length of time depending on whether any bowel had to be removed or not during the operation.

Unfortunately due to the high level of care required on the intensive care unit, sleeping arrangements are not possible by your child’s bedside; however accommodation can usually be provided onsite for parents.

Once your child is on one of our children’s wards, one parent will be able to remain resident on the ward in a bed at the side of the child’s bed.
How do I look after my child at home?

- All stitches used are dissolvable so these do not need to be removed.
- Your child may have some discomfort and should be given Paracetamol (Calpol) or other pain killers as directed by the nursing/medical staff.
- Your child should rest for the first few days at home and older children should avoid strenuous activities, for example PE/swimming for two weeks.
- The wound site should be kept clean and dry. It should not be submersed (for example, bathed) in water for five days.
- If paper tapes were applied these should be allowed to fall off naturally or be removed when your child is allowed a bath.
- If your child develops a fever or has increased pain you should contact your GP/nurse specialist.

Follow up

Your child will have an outpatient appointment to provide follow up, usually three months after discharge. This appointment is sent to you in the post. It is important that you contact the clinic if the appointment is not convenient so it can be re-arranged.

For further information please contact

Your nurse specialist: 01223 586973

The ward you were on:

To change your scheduled follow up appointment in: 01223 274555 (clinic 6)
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