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Replacing heparin flushing with saline flushing to prevent complications in long-term central venous catheters in children

Authors: Bradford NK, Edwards RM, Chan RJ

Background

A central venous catheter (CVC) is a long, thin, flexible tube which is inserted into a large central vein. This enables access to the blood stream for people with serious medical conditions to receive medications and fluids, as well as the collection of blood specimens. Long-term CVCs are used to access the blood system in children with complex medical conditions like cancer. To stop the catheter from becoming blocked it is usual to use heparin, a drug that prevents clots forming, to flush the catheter. However, some studies have shown that heparin is not necessary, and that normal saline (a sterile salt water solution) can be safely used instead. Heparin may be associated with complications, such as bleeding and infection, along with higher costs for healthcare providers. While the complications such as infections and occlusions are uncommon, practices vary around the world and there are many inconsistencies regarding the best flush solution to use to prevent complications in long-term catheters.

Study characteristics and key results

This review included randomised controlled trials (clinical studies where people were randomly assigned into one of two or more treatment groups) that compared the use of saline and heparin to prevent blockage, and other complications related to long-term catheters. The evidence is current to 9 April 2019. Two review authors independently reviewed the studies. We included four studies with a total of 255 participants in the review. The four trials were all undertaken in large teaching (tertiary) hospitals, and directly compared the use of saline and heparin. The studies were, however, very different in the way they compared saline and heparin, with different concentrations of heparin and different frequencies of flushes reported. We were able to combine the results of two studies: the analysis showed imprecise results for the blocking of catheters and blood stream infections for

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normal saline versus heparin. One study reported the duration of catheter placement to be similar between the two study arms.

Certainty of the evidence

The overall certainty of the evidence ranged from moderate to very low. There was high risk of bias for blinding, there were differences between the studies methods and interventions, inconsistent results between the studies, and not all studies reported all outcomes of interest. We found there was not enough evidence to determine which solution, saline or heparin, is more effective for reducing complications. Further research is required and is likely to have an important impact in this area. This review is an update of a review first published in 2015.

Tonsillectomy versus tonsillotomy for obstructive sleep-disordered breathing in children

Authors: Blackshaw H, Springford LR, Zhang L-Y, Wang B, Venekamp RP, Schilder AGM

Review question

This review compared the benefits and harms of surgery to remove the complete tonsils (tonsillectomy) against surgery to remove part of the tonsils (tonsillotomy) in children with disturbed sleep caused by breathing problems due to blockage of the upper airways (called obstructive sleep-disordered breathing). We included any studies in which children had either a tonsillectomy or tonsillotomy, published up to July 2019.

Background

Obstructive sleep-disordered breathing can occur in both children and adults. It ranges in seriousness from simple snoring to obstructive sleep apnoea syndrome (OSAS), where episodes of complete blockage of the upper airways and difficulty breathing can cause oxygen levels in the blood to drop, waking the child from sleep. Enlargement of the tonsils and adenoids is thought to be the most common cause in children. As such, tonsillectomy with or without removal of the adenoid (adenoidectomy) is considered a valuable first treatment option for most children. Over the past decade, driven by the availability of new surgical technologies and devices, tonsillotomy has become more popular. It is thought that children recover more quickly from this operation and may have fewer problems than after tonsillectomy.

Study characteristics

We included 22 studies, with a total of 1984 children aged 2 to 16 years with symptoms of obstructive sleep-disordered breathing. In three studies, a sleep study was also performed as part of the diagnosis. Children underwent tonsillectomy or tonsillotomy, with or without removal of the adenoid, and were followed after the operation for six days to six years. Nineteen of these studies measured some of the data we were looking to collect and analyse. However, we could only combine results from a limited number of studies as each study measured different outcomes and used different measurement instruments to do this. There were also difficulties in accessing the raw data from lots of studies.

Key results

Children with obstructive sleep-disordered breathing who are selected for tonsil surgery and who have a tonsillotomy seem to have a faster recovery from the operation compared to children who have a tonsillectomy, in particular in terms of return to their normal activity (four days quicker). Children who have a tonsillotomy may also have a slightly lower risk of having problems after the operation that need treatment

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with medication or further surgery than those who have a tonsillectomy (2.6% versus 4.9%). Any potential differences in terms of blood loss during the operation (14 mL) and pain scores at 24 hours after the operation (1.09 of a point on a 10-point scale) in favour of tonsillotomy were not considered noticeable.
Very few studies measured the effects of the two operations on the signs and symptoms of obstructive sleep-disordered breathing itself, quality of life of the child, the recurrence of obstructive sleep-disordered breathing or the need for a reoperation. Those that did found no evidence of a difference between the children who underwent tonsillectomy or tonsillotomy but these findings should be interpreted with great caution since the evidence derived from these studies was mostly of very low certainty.

Certainty of the evidence

The large majority of the studies included in this review had an unclear to high risk of bias and the evidence for most outcomes was of low to very low quality, meaning that the results are very uncertain. This means that we need more information from well-designed studies on the long-term outcomes of tonsillectomy and tonsillotomy to help parents and ENT surgeons choose which type of tonsil operation is best for children with obstructive sleep-disordered breathing who require surgery.

If you have any questions or comments with regard to the above document please feel free to contact me.

Kind regards

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Funding statement Funding statement Funding statement Funding statement Funding statement