Tracheostomy study

M. J. Cinnamond

Some years ago I did a study in which I looked at the reasons for tracheostomy in 100 consecutive cases. The general indications were as follows:

upper airway obstruction	49
prolonged assisted ventilation	43
frequent bronchial toilet	2
reduction of the respiratory dead space	2
access to the airway	4

Most of those with upper airway obstruction had a congenital abnormality of some sort, and included nine cases of, what I presumed to be, congenital subglottic stenosis. I do not know of any way in which one can be sure that a subglottic stenosis is truly congenital rather than an acquired or mixed stenosis.

Of the 43 children who were tracheotomized because of prolonged assisted ventilation, nine ended up with an acquired or acquired-on-congenital subglottic stenosis. Within this group I also looked at the underlying reason why these children required assisted ventilation in the first place and found the following:

respiratory diseases	14
cardiovascular diseases	6
neurological diseases	14
abdominal diseases	8

In those that required prolonged assisted ventilation with cardiovascular conditions there were no stenoses. In abdominal conditions there was one. In children with neurological conditions there were five instances of subglottic stenosis; perhaps these children are more prone to develop subglottic stenosis because they were moving around, they may be fitting and are, usually, in a slightly older age group. Other possible reasons include the type and size of tube used and the way in which it is fixed. The age of the child is probably important and it is my impression that with neonates and very small babies one can safely leave an endotracheal tube in position for a much longer time than one can in the older child.

To complete the picture, the remaining conditions for which tracheostomy was indicated were:

cystic fibrosis: where there was a tremendous amount of secretion present

muscular dystrophies: where there was a reduction in respiratory dead space and the chest wall was insufficiently strong to move air in and out

Hunter-Hurler syndrome or Pierre Robin syndrome: where it was impossible to intubate the child easily and where there was a need for further surgery.

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Cinnamond Discussion

Bailey

I do not agree with Professor Cinnamond's comments in which he was regarding as congenital stenosis those children in whom there was no apparent evidence of prolonged intubation. I think that the cases you can really say for sure are congenital subglottic stenosis are those children who have never ever been intubated because we have all seen children who have developed extremely tight subglottic stenosis after being only intubated for 24 to 48 hours.

Cinnamond

It may be impossible to discover that because many children are intubated at birth and the mother does not know about it.

When you try to dilate children with congenital stenosis my feeling is that they are less dilatable than children with acquired stenosis. In congenital stenosis, the problem really is one of an enlarged cricoid or an excessively thick cricoid ring, rather than submucosal fibrous tissue.

Bailey

We do not dilate our stenoses at all, or hardly at all, so I cannot really comment but I am sure you are right in saying that congenital stenosis is due to a grossly thickened cricoid ring, with no fibrosis within.

Kearns

We have also seen trapped first tracheal rings in these children with congenital subglottic stenosis.

The congenital stenosis may be associated with some degree of webbing as well, so that there is actually glottic stenosis in addition to the subglottic stenosis.

In the really severe ones there is no difficulty in making the diagnosis before they are ever intubated. Dr Evans and I had a case that was unintubatable and there was never any question that it was a congenital stenosis, both subglottic and glottic and I think a fair proportion of them are.

Bailey

These are two particularly interesting categories. I have also seen cases that, endoscopically, I thought were

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just a severe anterior glottic web, with the typical wedge shaped extension into the subglottis but, in fact, at surgery it was clear that they blended into a congenital stenosis below.

The other group is the one that Dr Kearns has alluded to and we have seen two or three recently with an underriding first tracheal ring that has gone up inside the cricoid and this has been described as a congenital abnormality, although I wonder whether perhaps a tracheostomy that is too high may cause the first ring to rise up under the cricoid.

Kearns

Was laryngeal trauma ruled out in road traffic accidents and subglottic stenosis? We have seen children who ended up with tracheostomies and no one ever made the diagnosis of laryngeal trauma.

Bull

The laryngeal trauma occurs in the casualty department where you have an unconscious bleeding child and a frightened casualty officer who intubates hurriedly and possibly roughly.

Dinwiddie

All of those children are also likely to have a raised intracranial pressure which is a cause of stridor in itself.

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