

Letters to the Editor

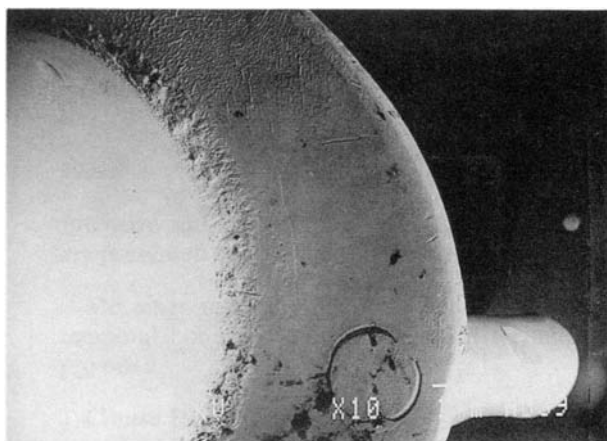


Fig. 1

Corrosion in the brazing joint between outer tube and retentive plate by electronmicroscopy.



Fig. 2

The same demonstrated by ordinary light microscopy.

How to disclose imminent fracture of brazing alloy in a tracheostomy tube

Dear Sir,

In their paper Brockhurst and Feltoe (1991) recently reported a fatal case of a broken tracheostomy tube. Thorough examination had disclosed corrosion of the brazing alloy between the outer tube and the retentive plate, causing a reduced strength by about 50 per cent. The alloy was subjected to corrosion causing a partial fracture and subsequently fracture of the remaining intact joint due to stress. Metalurgical examination demonstrated, that the main reason for corrosion was the use of a rather simple alloy often used in engineering containing only 45 per cent silver, 15 per cent copper but 24 per cent of cadmium, which is toxic, and 16 per cent of zinc responsible for the extraordinary high corrosion presumably caused by body fluids. Some cleaning agents, hypochlorite in particular can cause that corrosion, but was scarcely used. Regular inspection of the brazing and strength testing is recommended in existing tubes, but manufacturers should be asked to use an alloy of highest possible sterling worth in order to ensure the highest obtainable corrosion resistance.

In 1988, we had an identical experience; however, in our case a fracture of a silver-plated, German silver tracheostomy tube, it was luckily not fatal. The tube was examined metallurgically by Institute of Technology, Aarhus, Denmark. It was demonstrated, that the brazing was poorly done only securing one-third of the circumference. The brazing alloy was a simple standard alloy for technical purposes and subjected to heavy corrosion and subsequent fracture. Besides, when the silver plate is worn, the patient is exposed to the German silver with the allergenic nickel content. Our conclusion was to avoid the use of tubes made by silver-plated, German silver for long-term use and to discard when the silver plate was worn.

However, we got a security check on our stock of tracheostomy tubes by an engineer from the Institute of Technology. During that a typical dangerous item was found. The brazing demonstrated a porous surface indicating severe corrosion and through that a fracture could be imminent. The corrosion is demonstrated by electron microscopy (Fig. 1) and by ordinary light microscopy (Fig. 2).

We forward the photographs as a help to others to a regular security check of the stocks of tracheostomy tubes.

Yours faithfully,
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References

- Brockhurst, P. J., Feltoe, C. K. (1991) Corrosion and fracture of a silver tracheostomy tube. *Journal of Laryngology and Otology*, **105**, pp. 48–49.
- Wetke, R., Bach, L. (1991) Aspiration af knækket trachealkanyle (Danish). *Ugeskrift f Laeger*, **153**, 117–118.

Reply:

Dear Sir,

The letter from Wetkoe and Jeppeson presents a further example of the corrosion of standard grade silver brazing alloy, and raises several points for comment.

1. Quality control at manufacture and on receipt of products cannot be taken for granted where health is involved. Correct inspection procedures form part of the cost of a product.
2. The regular testing of the mechanical integrity of devices in use by hand pressure can be easily carried out to prevent failure during use, and should be introduced as a standard procedure.

3. Normal engineering grades of silver brazing alloy will corrode when left in contact with body fluids for any length of time. The use of the best possible grade should be mandatory.
4. Tracheostomy tubes comprise only a small part of the total armamentarium of surgical devices, so that materials and design lag behind other areas. Modern materials which can remain in the body permanently should be used for their construction, incorporating the necessary changes to design and mode of manufacture.
5. Moulded PVC tubes are used, but care is required to prevent degradation by body fluids or sterilization. Item 2 above should be rigorously applied.

Yours faithfully,
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