Following copper ingestion, gastrointestinal symptoms generally develop within 15 min and may be severe enough to produce shock. Early deaths are due to shock, while hepatic and renal failure account for delayed mortality. Copper poisoning affects the erythrocytes, the liver, and the kidneys in the order named. Intravascular haemolysis appears 12-24 h following ingestion. Haemolytic anaemia is caused either by direct cell membrane damage or indirectly as a result of the inactivation of enzymes which protect against oxidative stress.

Jaundice is partly hepatic in origin in addition to haemolysis.

The haem pigment released due to haemolysis, direct toxic effect of copper, and hypotension as a result of gastrointestinal losses may result in renal failure. When the concentration of hepatic copper is greater than 50 mg/g dry weight, liver cell necrosis occurs with release of large amounts of copper into the serum. This released copper is taken up by the erythrocytes and may account for the delayed secondary episode of haemolysis.

Our patient probably had delayed haemolytic anaemia as evidenced by a fall in haemoglobin concentration from 8.8 g% at the time of admission to the private hospital to 2.8 g% on admission to our hospital. Copper poisoning is associated with high mortality compared to other metal toxicities.

Treatment of copper sulphate poisoning is largely symptomatic. Though chelating agents have been used in the treatment of acute copper poisoning, there are no controlled studies regarding their use. In addition, the presence of acute renal failure limits the potential for antidotes. The role of dialysis is limited to the management of associated renal failure. We did not use chelators in our case. The role of steroids to treat corrosive burns is controversial. Hepatic and renal dysfunction in our case was managed conservatively.

ACKNOWLEDGEMENT

Authors wish to acknowledge the guidance given by Dr. Smita Prakash MD, Senior Specialist, in preparation of the manuscript.

Nishant Sood, PK Verma
Department of Anaesthesiology & Intensive Care, Vardhman Mahavir Medical College & Safdarjang Hospital, New Delhi - 110 029, India

Address for correspondence:
Dr. Nishant Sood,
8, Deshbandhu Society, Plot No.-15, Patparganj, Delhi - 110 092, India.
E-mail: nishantsood@yahoo.com

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Tri-colour concept with the use of LMA CTrach

Sir,

In the past few years, a new optical intubation device, i.e. laryngeal mask airway (LMA) CTrach has emerged as a useful alternative for the facilitation of tracheal intubation in difficult airway situations provided the interdental distance is ≥25 mm.[1] The LMA CTrach is functionally identical to intubating laryngeal mask airway (ILMA), but in addition has an integrated fibreoptic bundle with liquid crystal display (LCD). This system enables ventilation and allows real-time visualization of endotracheal intubation.[2]

The LMA CTrach is inserted in neutral head position using one handed rotational technique.[2] Following confirmation of the adequate lung ventilation, the viewer is connected to the CTrach and the laryngeal structures are visualized. After obtaining the best laryngeal view, the tracheal tube is passed through the barrel of the CTrach and tracheal intubation is facilitated under direct vision. However, the most common problem encountered with the use of LMA CTrach is the frequent requirement of application of
corrective manoeuvres to obtain the best laryngeal view which ultimately determines the success of intubation.\[3\] The causes of poor view of vocal cords include down folding of the epiglottis, contact with the lens, secretions or fogging of the lens during insertion.\[1\] If complete view of laryngeal structures is not achieved, the corrective manoeuvres are applied according to the likely causes of poor view which are listed in Table 1. These manoeuvres include the technical adjustments, e.g. changes in focus and light intensity and the positional adjustments, e.g. changes in the depth of insertion, external manipulation of the larynx, down-up-down manoeuvre and Chandy’s manoeuvre.\[1\] For down-up-down manoeuvre, the inflated CTrach is slightly pushed down, in case of no improvement in view it is slowly withdrawn from the pharynx by about 6 cm while watching the monitor and then reinserted. This manoeuvre helps in adjusting the depth of insertion and also unfurling the epiglottis.

On initial insertion, if the complete laryngeal view is not seen on the viewer, the presence of three distinct colours, i.e. red, white and black can indicate the likely causes of inadequate view. The knowledge of this tri-colour concept described below can be extremely helpful in obtaining the best laryngeal view and performing intubation successfully through the LMA CTrach.

Once the best laryngeal view is achieved, the application of medial-lateral manoeuvre can help in centralizing the glottic aperture on the viewer and finally the application of Chandy’s manoeuvre (using the CTrach handle to lift the CTrach cuff away from the posterior pharyngeal wall) at the time of intubation can eventually influence the success of first attempt intubation.\[4\]

The achievement of the best laryngeal view and facilitation of tracheal intubation through the LMA CTrach can be made simpler by understanding of this tri-colour concept. We feel that the learning of tri-colour concept should be an integral part of the teaching of CTrach use as it can help in increasing the efficacy of this useful airway device in difficult airway situations.

Table 1: Tri-colour concept

| Colour                   | Causes                                      | Prevention                          | Management                        |
|-------------------------|---------------------------------------------|-------------------------------------|-----------------------------------|
| Red (with partial or no laryngeal view) | Lens touching the mucosa or epiglottis Presence of blood | Correct size selection Gentle approach | Down-up-down manoeuvre Suction out the blood /secretions and clean the lens if required |
| White                   | White secretions                            | Antisialogogue therapy before CTrach insertion | Suction out the secretions Remove, clean and reinsert the CTrach |
| Black                   | Low light intensity                         | Adjust the light intensity before start of procedure | Adjust the light intensity |
|                         | Inadequate depth of insertion               |                                     | Adjust the depth of insertion     |

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Website:  www.ijaweb.org  
DOI: 10.4103/0019-5049.79880