IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861. Volume 9, Issue 4 (Sep.- Oct. 2013), PP 01-04
www.iosrjournals.org

Management of Flexometallic Tube Obstruction during Neurosurgery: A Case Report.

Ayaskant Sahoo[1], Suranjith Sorake[2], S Padmanabha[3]
[1](Post graduate, Department of anaesthesiology,Yenepoya Medical College, Mangalore, Karnataka, India)
[2] (Assistant professor, Department of anaesthesiology, Yenepoya Medical College, Mangalore, Karnataka, India)
[3] (Professor and head of the Department of anaesthesiology,Yenepoya Medical College, Mangalore, Karnataka, India)

Abstract: *Armored tubes are an integral part of the anaesthesiologist's arsenal of equipments. Its special quality to resist kinking makes it an extremely useful device for use in neurosurgical procedures where extreme positioning is needed. But incidences of tube kinking have been reported.Immediate diagnosis and management is essential in avoiding lethality. We describe a similar incidence of armored tube kinking and its successful management without re-intubation. We highlight the fact that just the use of armored tubes is not a fool-proof way of a secure and patent airway, extreme precaution has to be taken in patient positioning and vigilance throughout the procedure.*
Keywords:*Armored tube, Flexometallic tube, Kinking, Neurosurgery****.***

I. Introduction

A 34 year old female (height 152cm, weight74kg) was posted for meningioma excision from the right parietal region of brain. The patient was classified as A.S.A grade II pre-operative assessment. General anaesthesia was administered according to our institute protocols, and patient was intubated using a brand new 7.0mm I.D cuffed (**Safety Flex, Mallinkrodt Medical, Athlone, Ireland**) armored tube. Patient was positioned in semi sittingdecubitus(beach chair) position. The endotracheal tube was connected to ventilator and the hose pipes of the ventilators were secured to the operating table using adhesive tapes. After draping surgery started and went on uneventfully for 4hours. By this time craniotomy was done and meningioma tissues were being excised when the ventilator gave alarm of high peak airway pressure reaching 38cm H_2O. The ventilation circuit was changed over to manual Bain circuit and tight bagging was realized. Initially it was suspected of mucus plugin the ETT tube, a suction catheter was inserted but it failed to pass through and even the smallest suction catheter could not be introduced. At this point a kink in the armored tube was suspected. The surgeon was asked to stop, endotracheal tube was inspected and intraluminal part demonstrated a kink (**Picture 2**) in the inner lumen which was obstructing the air flow. The kink was observed proximal to the oral cavity. Immediately the tube was cut distal to the bleb and a connector from a smaller size PVC ETT (5.0mm I.D ETT) was used as the machine end connector(**Picture 1, 3, 4**).It was connected to ventilator, secured using adhesive tapes (**Picture 3,5**) and surgery proceeded uneventfully without any complications.

II. Discussion:

Surgeries of head and neck, neurosurgeries, procedures requiring prone positioning are challenging even to the most skillful anaesthetist[1]. Extreme degree of flexion and extension are often required for proper positioning in addition to the compressive forces. Regularly used PVC endotracheal tubes have limited ability to withstand such extreme pressures. Armoredtube(wire reinforced, flexometallic,) preferred in such conditions due to the added strength provided by the solid wires within the tube[1]. Various complications related to use of armored tubes have been described, kinking due to biting of the tube, collapse of the tube inside the inflated cuff, obstruction caused by folding of the inner wall around the connector, double layering of the cuff preventing deflation[2]. Complication incidences are increased with reuse of tubes[2,7]. Studies have shown that armoured silicone tubes may have defects in manufacturing that leads to complications and with proper precaution PVC endotracheal tubes can be used safely in head and neck procedures[3]. A similar case report to ours was reported but with a PVC endotracheal tube which kinked due to patient biting on the tube[4].Intraoperative increase in peak inspiratory airway pressure in a mechanically ventilated patient can be due to one or many of the causes[5] listed in **Table 1.** In our case there was bubble in the intraluminal part measuring about 3cm in length which may have been formed by diffusion of nitrous oxide into the wall where a preexisting small bubble increased in size due to constant inflow of nitrous oxide thus occluding the airway, management can be done by cutting off nitrous oxide and maintaining anaesthesia using only oxygen, air and inhalational agent if re-intubation is not possible[2]. Few other incidents have been reported where management was by

extubation followed by reintubation[6,7] but in our case this option was excluded owing to the stage of the operation and the kink being visible externally.

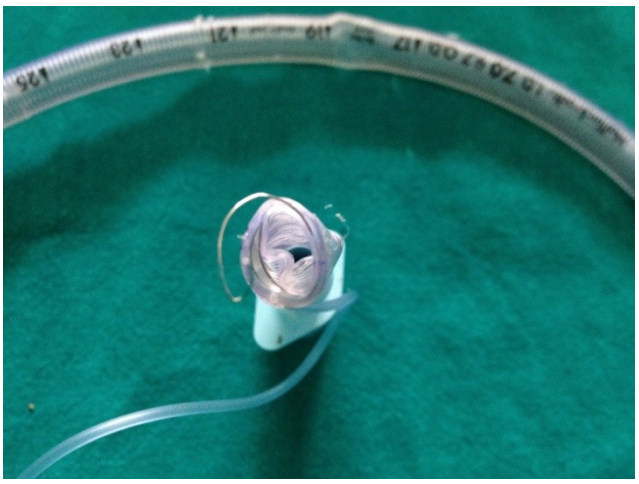
Table 1 Causes of high inspiratory pressure[5]

Ventilator associated • Inappropriate settings • Malfunction Circuit associated • Fluid pooling in circuit • Fluid pooling in filter • Kinking in circuit Endotracheal tube obstruction • Sputum, biting Increased airway resistance • Bronchospasm	Decreased respiratory system compliance • Parenchymal disease • Pleural disease e.g, pneumothorax • Decreased chest wall compliance • Decreased ventilated lung volume ○ Sputum plugging ○ Lobar/lung collapse Endobronchial intubation

III. Conclusion

Flexometallicendotracheal tubes are preferred in head and neck surgeries to provide secure and patent airway, but occasionally sudden obstruction may be possibledue to kinking, secretions and bubble in the intraluminal part of the tube, hence greater vigilance is required on the part of anesthesiologist. Proper planning, precautions and meticulous examination of tubes should be done prior to induction of anaesthesia to avoid such complications.

Picture 1

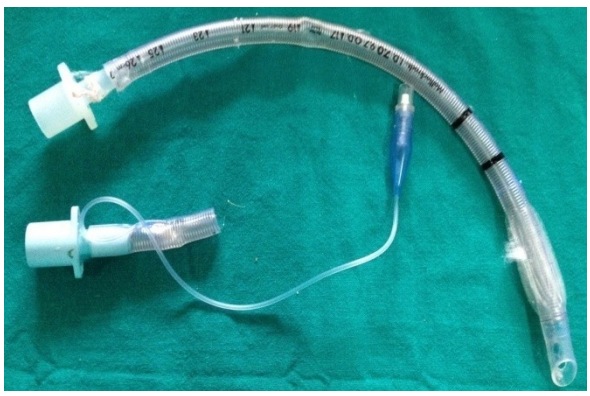


Picture 2

Picture 3

Picture 4

Picture 5



Picture 6

References

[1]. J M Porter, C Pidgeon, A J Cunningham The sitting position in neurosurgery: a critical appraisal.Br. J. Anaesth. (1999) 82(1): 117-128
[2]. Kie-ChulOhn, Wen-hsien Wu. Another Complication of Armored Endotracheal Tubes. A & A March 1980 vol. 59 no. 3 215-216.
[3]. Peter J. Wright, Janitha V. B. Mundy, Catherine J. Mansfield Obstruction of armoured tracheal tubes: case report and discussion Can J anaesth 1988 35(2): 195-197
[4]. Niu HH, Ho CT, Tsai PS Successful detection and management of unexpected endotracheal tube kinking during neurosurgery--a case report. ActaAnaesthesiol Taiwan. 2004 Jun;42(2):119-23
[5]. http://www.aic.cuhk.edu.hk/web8/Mech%20vent%20troubleshooting.htm
[6]. Gurumurthy T, Rammurthy K, Mahmood LS, Hegde R. An unusual complication of reinforced tube reuse. J AnaesthesiolClinPharmacol 2012;28:528-30
[7]. Balakrishna P S, Shetty A, Bhat G, Raveendra U S. Ventilatory obstruction from kinked armoured tube. Indian J Anaesth 2010;54:355-6