Endotracheal tube cuff over inflation

Placement of a cuffed endotracheal tube for the administration of general anesthesia is routine. The cuff of the endotracheal tube is inflated with air to achieve an adequate seal to prevent micro-aspiration. Over inflation of the cuff can decrease the mucosal perfusion, leading to pressure necrosis and nerve palsy. Inadequate seal can lead to micro aspiration. So the cuff pressure has to be monitored and kept within the prescribed limits of 20-30 cms of water.

Excessive endotracheal tube cuff pressure can also cause mucosal ischaemia leading to tracheal stenosis or tracheooesophageal fistulae [1)].

Methods have been developed to estimate adequate endotracheal tube cuff (ETTC) pressurization but do not provide accurate endotracheal tube cuff pressure (ETCP) measurements. Hence, different sized syringes may play a role in determining ETCP.

Two hundred patients were randomized to use of either a 10mL syringe (standard syringe) or a 5mL syringe (study group) for ETTC inflation. Following insertion of the endotracheal tube, the ETTC was inflated per the attending anesthesiologist. Within 10 minutes of intubation, ETCP was measured with a hospital provided manometer.

The percentage of in range cuff pressures for the 5mL group was 10.53% and 6.78% for the 10mL group. 84.21% (n = 64) of the study group and 91.53% (n = 54) of the control group had cuff pressures exceeding 30 cmH2 O. Although the study did not demonstrate that syringe size was predictive of ideal cuff pressure ranges, the average cuff pressure for the 5mL group was 55.8 cmH2 O versus 68.8 cmH2 O in the 10mL group.

Although both 5mL and 10mL syringes resulted in elevated cuff pressures after intubation, 5mL syringes resulted in a lower degree of elevation. Use of a 5mL syringe should be considered when inflating the endotracheal cuff to possibly reduce patient harm secondary to elevated cuff pressures. Further studies assessing smaller syringe sizes to reduce cuff pressures are warranted [2)].

In an observational study conducted on 70 patients undergoing neurosurgical procedures in various positions. After intubation, the cuff pressure was checked with a cuff pressure manometer, Endotest (Teleflex Medical, Rush) and adjusted to be within the allowable pressure limits as is the routine practice. The cuff pressure was checked again at three time points after achieving the final position with the head on pins, at the end of the procedure and before extubation. Various factors such as the age, position, duration of surgery were studied. There were no major complications like aspiration, stridor or hoarseness of voice post extubation in any of the patients.

A significant decline in the cuff pressures were noted from the initial supine position to extubation ($P < .001$) in the supine group. Also a significant decline in the cuff pressures were found in the prone group from their initial intubated supine position to all the other three corresponding time points namely after final positioning ($P < .001$), at the end of the procedure ($P < .001$) and before extubation ($P < .001$).

Cuff pressure has to be checked after achieving the final positioning of the patient and adjusted to the prescribed limits to prevent micro aspiration [3)].

In anterior cervical spine surgery a retractor is obligatory to approach the spine. Previous studies showed an increase of endotracheal tube cuff pressure after placement of a retractor. It is known that high endotracheal tube cuff pressure increases the incidence of postoperative dysphagia, hoarseness, and sore throat. However, until now no evidence supports the fact whether adjusting the endotracheal tube cuff pressure during anterior cervical spine surgery will prevent this comorbidity. We present the design of a randomized controlled trial to determine whether adjusting endotracheal tube cuff pressure after placement of a retractor during anterior cervical spine surgery will prevent postoperative dysphagia.

177 patients (aged 18-90 years) scheduled for anterior cervical spine surgery on 1 or more levels will be included. After intubation, endotracheal tube cuff pressure is manually inflated to 20 mm Hg in all patients. Patients will be randomized into two groups. In the control group endotracheal tube cuff pressure is not adjusted after retractor placement. In the intervention group endotracheal tube cuff pressure after retractor placement is maintained at 20 mm Hg and air is withdrawn when cuff pressure exceeds 20 mm Hg. Endotracheal tube cuff pressure is measured after intubation, before and after placement and removal of the retractor. Again air is inflated if cuff pressure sets below 20 mmHg after removal of the retractor. The primary outcome measure is postoperative dysphagia. Other outcome measures are postoperative hoarseness, postoperative sore throat, degree of dysphagia, length of hospital stay, and pneumonia. The study is a single centre double blind randomized trial in which patients and research nurses will be kept blinded for the allocated treatment during the follow-up period of 2 months.

Postoperative dysphagia occurs frequently after anterior cervical spine surgery. This may be related to high endotracheal tube cuff pressure. Whether adaptation and maintaining the pressure after placement of the retractor will decrease the incidence of dysphagia, has to be determined by this trial [4].

References

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