validated as being a measure of steady-state neurotransmitter turnover and, hence, neurotransmission in monoaminergic pathways.[10] Using these ratios, we determined that noradrenergic neurotransmission was significantly (unpaired *t* test corrected for multiple comparisons) lower in animals treated with clonidine, 0.1 mg/kg, than in parallel control animals (fig. 1) Dopamine and serotonin turnover were unaffected.

While these studies do demonstrate concomitant reductions in noradrenergic neurotransmission and anesthetic requirements for halothane following clonidine administration, a causal relationship has not been established. Additionally, the postsynaptic alpha$_2$ adrenoreceptors[11] may be an important mediating mechanism for the anesthetic-sparing action of the alpha$_2$ agonists and require further investigation.[12]

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REFERENCES

1. Longnecker DE: Alpine anesthesia: Can pretreatment with clonidine decrease the peaks and valley? ANESTHESIOLOGY 67:1–2, 1987
2. Ghinone M, Calvillo O, Quintin L: Anesthesia and hypertension: The effect of clonidine on perioperative hemodynamics and isoflurane requirements. ANESTHESIOLOGY 67:3–10, 1987
3. Flacke JW, Bloor BC, Flacke WE, Wong D, Dazza S, Stead SW, Laks H. Reduced narcotic requirement by clonidine with improved hemodynamic and adrenergic stability in patients undergoing coronary bypass surgery. ANESTHESIOLOGY 67:11–19, 1987
4. Bloor BC, Flacke WE: Reduction of halothane anesthetic requirement by clonidine an alpha$_2$ adrenergic agonist. Anesth Analg 61:741–745, 1982
5. Kaukinen S, Pykko: The potentiation of halothane anesthesia by clonidine. Acta Anaesthesiol Scand 23:107–109, 1979
6. Louie GL, Prokocimer PG, Nicholls EA, Maze M: Aminophylline shortens thiopental sleep-time and enhances noradrenergic neurotransmission in rats. Brain Res 383:377–381, 1986
7. Mueller RA,Smith RD, Spruill WA, Breese GR. Central monoaminergic neuronal effects on minimum alveolar concentrations (MAC) of halothane and cyclopropane in rats. ANESTHESIOLOGY 42:142–153, 1975
8. Roizen MF, White PF, Eger EI II, Brownstein M: Effects of ablation of serotonin of NE brain-stem on halothane MAC's in rats. ANESTHESIOLOGY 49:252–255, 1978
9. Nicholls EA, Louie GL, Prokocimer PG, Maze M: Halothane anesthetic requirements are not affected by aminophylline treatment in rats and dogs. ANESTHESIOLOGY 65:637–641, 1986
10. Smythe BGA, Bradshaw JE, Vining RF: Hypothalmic monoamine control of stress-induced adrenocorticotropin release in the rat. Endocrinology 113:1062–1071, 1983
11. Young WS, Kuhar MJ: Noradrenergic alpha and alpha$_2$ receptors: Light microscopic autoradiographic localization. Proc Natl Acad Sci USA 77:1696–1700, 1980
12. Unnerstall JR, Kopajtic TA, Kuhar MJ: Distribution of alpha$_2$ agonist binding sites in the rat and human CNS: Analysis of some functional anatomic correlates of the pharmacologic effects of clonidine and related adrenergic agents. Brain Res 319:69–101, 1984

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Bronchial Intubation in Children: Does the Tube Bevel Determine the Side of Intubation?

To the Editor:—In a recent report, Kubota *et al.*[1] have shown that the angle of the tracheal bifurcation in children totalled approximately 80°; the right bronchial angle being 31 ± 5°, while the left bronchial angle was 49 ± 7°. This anatomic tracheobronchial relationship favors inadvertent[1] or intentional[2] intubation of the right mainstem bronchus. However, Block[3] challenged this conclusion, suggesting that the tracheal tube invariably enters the right bronchus because the bevel of the tube faces to the left following insertion,[4] and its tip, therefore, lies to the right of the midline of the trachea. In this report, we try to answer the question of whether the bevel of the tracheal tube determines the side of bronchial intubation in children.

Investigation was approved by the human studies committee. It was carried out on 10 children, aged 1–6 yr, undergoing inguinal herniorrhapy during general anesthesia. For every child, two Portex® tracheal tubes of appropriate size were prepared; one of the tubes was the already available left-bevelled tracheal tube. The distal end of the second tube was modified to have about 45° right bevel; the edge was then polished and the tube resterilized. All children were premedicated with intramuscular pentobarbital 4 mg · kg^{-1} and atropine 0.02 mg · kg^{-1}. Anesthesia was induced with iv thiopental 5 mg · kg^{-1} and succinylcholine 1.5 mg · kg^{-1}, and the patient was ventilated by 100% oxygen. While the child was in the supine position with the head

and neck in the midline, direct laryngoscopy was performed and orotracheal intubation using the left-bevelled tube was performed. The tracheal position of the tube was verified by chest auscultation, which revealed equal breath sounds on both sides. The tube was then blindly pushed down until breath sounds were heard on only one side of the chest. After the bronchial location of the tube was verified by chest auscultation, the tube was withdrawn into the trachea and both lungs were ventilated. The trachea was then extubated and the same steps were repeated using the right-bevelled tube. Each child acted as his or her own control. Throughout the period of investigation, which lasted 3–5 min, the children were ventilated with 100% oxygen.

In all children, the left-bevelled tube entered the right main bronchus,while the right-bevelled tube entered the left main bronchus. These results suggest that bevel of the tracheal tube, and not tracheobronchial angle, is the principal factor determining the side of bronchial intubation.

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REFERENCES

1. Kubota Y, Toyoda Y, Nagafa N, Kubota H, Sarvada S, Murkawa M, Fujimori M: Tracheo-bronchial angles in infants and children. ANESTHESIOLOGY 64:374–376, 1986
2. Baraka A, Slim M, Dajani A, Lakkis S: One-lung ventilation of children during surgical excision of hydated cysts of the lungs. Br J Anaesth 54:523–528, 1982
3. Block EC: Tracheo-bronchial angles in infants and children. ANESTHESIOLOGY 65:236–237, 1986
4. Brown TCK, Fisk GC: Anaesthesia for Children, 1st edition. Melbourne, Blackwell Scientific Publications, 1979, p 3

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