Correspondence

Malposition of Left-sided Double-lumen Endobronchial Tubes

To the Editor:—We read with interest the clinical report by Brodsky et al.\(^1\) concerning "Malposition of Left-sided Double-lumen Endobronchial tubes"; we wish to reinforce their impression that obstruction of the left upper lobe bronchus is a potential hazard when using a left-sided double-lumen tube. Brodsky et al. note the need for careful auscultation over the area of the upper lung fields to determine correct positioning of the tube and suggest that fiberoptic bronchoscopy is only required when auscultation is "difficult." We would like to describe a case of left upper-lobe obstruction that occurred when using a left-sided polyvinylchloride double-lumen tube. Careful auscultation after placement of the tube and after positioning of the patient revealed satisfactory and equal breath sounds over all areas of the chest including the axilla. However, at left thoracotomy it was immediately evident that the left upper lobe was not being ventilated. Fiberoptic bronchoscopy was immediately performed and the bronchial cuff could not be seen. Therefore, both cuffs were deflated and the tube withdrawn under direct bronchoscopic vision until the bronchial cuff became visible. Ventilation immediately returned to the left upper lobe.

Breath sounds can be transmitted from one region of the lung to adjacent areas. Benumof\(^2\) has suggested that auscultation in the axillary region decreases the likelihood of hearing such transmitted sounds. However, our case suggests that the presence of breath sounds in this area may be misleading. We feel that the only reliable method of confirming correct positioning of the bronchial limb of a double-lumen tube is by routinely performing fiberoptic bronchoscopy after tube placement. This is now our standard practice.

G. B. Smith, B.M., F.F.A.R.C.S.
Department of Anesthesiology
Yale University
School of Medicine
333 Cedar Street
P. O. Box 3333
New Haven, Connecticut 06510

REFERENCES


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Correction of a Recurrent Error

To the Editor:—We write to call to the attention of your readers a substantive typographic error present in several texts that they may use. The error occurs in the equation giving the pressure drop associated with fully developed turbulent fluid flow (liquids or gases) through straight tubes. The correct formula is

\[ P = \frac{fL \rho \dot{V}^2}{4\pi r^5} \]

where: \( P \) = pressure difference between the ends of the tube; \( f \) = dimensionless friction factor that depends on tube wall roughness and weakly on the Reynolds number, \( L \) = length of the tube; \( \rho \) = fluid density; \( \dot{V} \) = flow rate; and \( r \) = internal radius of the tube. One consistent set of units is: \( P \) in dyn/cm\(^2\), \( L \) and \( r \) in cm, \( \rho \) in g/cm\(^3\), and \( \dot{V} \) in cm\(^3\)/s.

Benumof in Anesthesia\(^1\) and Sykes in Scientific Foundations of Anaesthesia\(^5\) give the formula incorrectly; both texts omit the fluid density term (\( \rho \)) in the numerator on the right side of the equation. Benumof references Sykes for the relationship. Sykes gives no reference. We believe both of these errors have their origins in a mistake in the Handbook of Physiology,\(^8\) which gives the relationship in just the form seen in the other two texts and with the same error.

\* Recall that 981 dyn/cm\(^2\) = 1 cmH\(_2\)O pressure.
\( ^\dagger \) The same error, in Sykes,\(^2\) is also present in previous editions.