BILATERAL NASOTRACHEAL INTUBATION FOR CLOSED SYSTEM ANAESTHESIA *

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NOT uncommonly when nasotracheal intubation is required for anaesthesia in certain operations, the nasal passages are so small that it is impossible to provide an adequate airway by intubation through one nostril alone. When the operation contemplated is to be short, the resistance to respiration caused by constriction of the airway may be a matter of little consequence. If, on the other hand, the surgical procedure is likely to require more than a few minutes, such resistance may lead to complications which are at least disconcerting to the anaesthetist and the surgeon, and perhaps dangerous for the patient. These complications are: increase

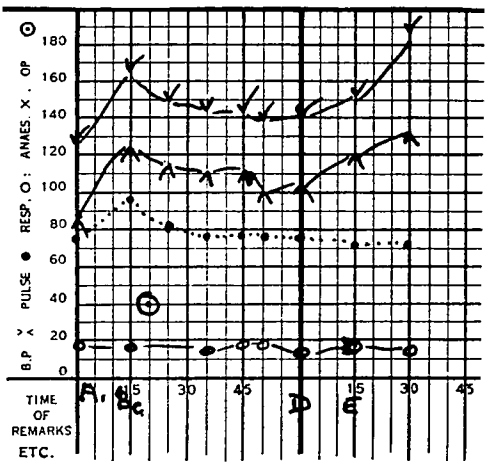

FIG. 1. Typical blood pressure chart of patient with small nose, intubated through one nostril only. Tube constricted.

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in systemic blood pressure, anoxia, pulmonary edema, respiratory failure and cardiovascular collapse.

The most common of these complications is a progressive rise in systemic blood pressure, especially in the lighter planes of anaesthesia. This occurs in spite of forced ventilation, because forced ventilation cannot influence the resistance to expiration. Because of this resistance, the residual air increases, and carbon dioxide accumulates in the blood and alveolar air. Even though pressure on the rebreathing bag is used to assist inspiration, some degree of anoxia will be added to this accumulation of carbon dioxide. Figure 1 shows a typical chart of blood pressure, pulse and respiration in such a patient. The patient was a

FIG. 2. Intrapharyngeal view of small nasal tubes connected to Y-tube in pharynx.

muscular young man, age 28, weight 195 lbs. A thin-walled, No. 9 Magill tube was easily passed through the right nostril, and blind intubation was performed. A paraffined gauze pack was used in the pharynx. Respiration through the tube seemed to be free, and there was no evidence of obstruction to the airway. However, within ten minutes of intubation, blood pressure was 160 mm. systolic and 120 mm. diastolic, as compared with a preanaesthetic level of 128 mm. systolic and 84 mm. diastolic. From this time until completion of the operation, inspiration was assisted by manual compression of the rebreathing bag of the Heidbrink machine. The blood pressure gradually decreased to 140 mm. systolic and 100 mm. diastolic, but expiration became progressively more labored. The soda-lime canister was renewed, without effect, and during the last half hour of the operation the blood pressure gradually rose to

180 mm. systolic and 130 mm. diastolic. This rise was associated with a marked increase in bleeding. At extubation it was evident that the tube had been compressed in the nose.

Similar cases were met so frequently that some method was sought by which the cross section of the airway could be increased without encroaching on the operative field in operations involving the mouth and lower face. Smaller tubes might escape compression, but, if used in the orthodox manner, could not be expected to provide an adequate airway in this type of patient. Insufflation anaesthesia might have served our purpose, but we wished to administer cyclopropane to these patients. The passage of smaller tubes through both nostrils into the trachea was tried, but few

FIG. 3. Apparatus for reduction of two nasal tubes to single outlet of gas machine.

patients possess a larynx which will accommodate two tubes of adequate diameter.

The problem was solved by the construction of a short endotracheal tube with a short "Y" at the upper end, of such a diameter that a No. 6 Magill tube would slide into each arm of the "Y," and fit there snugly, but without compression. This is introduced under direct vision, so that the "Y" rests in the pharynx. The width of the upper end will effectively check its passage through the larynx. A short, No. 6 Magill catheter is passed through each nostril, and under direct vision is introduced into the corresponding arm of the "Y" on the upper end of the endotracheal tube. This is accomplished with surprising ease if the endotracheal tube is held steady by a Magill forceps. The external ends of the two nasal tubes are then connected through a short, wide-bore metal "T" to the

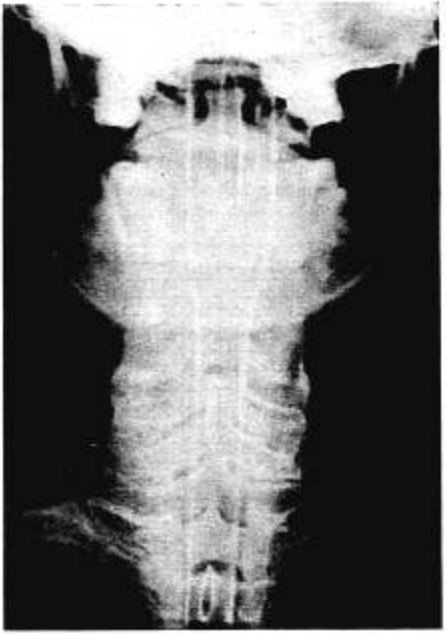

FIG. 4. Tubes in place in a patient.

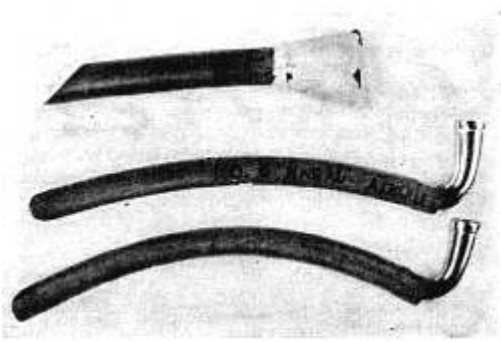

FIG. 5. Tubes before assembly. The white material about the Y on the upper end of the large tube is latex rubber, which was used to cement the Y to the tube.

single outlet of the gas machine. Paraffined gauze packing in the pharynx supports the "Y" so that it cannot make pressure on the larynx.

Figure 2 illustrates the intrapharyngeal connection to the endotracheal tube. Figure 3 shows the apparatus for reduction of the two tubes to a single connection to the gas machine, held in place by a head harness. Figure 4 is a roentgenogram of the tubes in place in a patient. Figure 5 shows the apparatus before assembly.

This method of intubation has proved much easier to use than had been anticipated, and has given free and unrestricted respiration. The average, combined cross-section area of the two No. 6 Magill nasal tubes

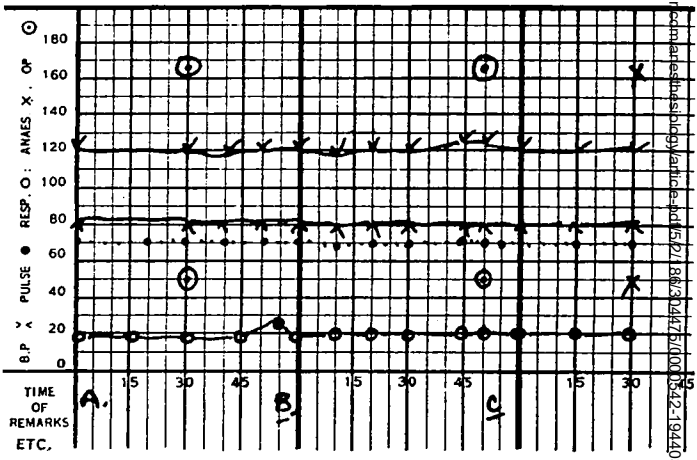

FIG. 6. Typical blood pressure, pulse and respiration chart of a patient intubated by this method. No tube larger than No. 6 Magill would pass through the nose in this case.

is 100.6 sq. mm., compared with an average cross-section area of 78.5 sq. mm. for a No. 10 Magill tube.

Figure 6 is a typical chart of the blood pressure, pulse and respiration of a patient intubated by this method. In this case no tube larger than No. 6 Magill would pass easily through either nostril. This chart should be compared with figure 1.

SUMMARY AND CONCLUSIONS

1. It is frequently impossible to provide an adequate airway by nasotracheal intubation through one nostril in cases in which the surgical situation demands this type of technic.

2. Resistance to respiration caused by constriction of the airway leads to complications which produce poor operating conditions, and may become serious for the patient.

3. A method of nasotracheal intubation is described in which small tubes passed through both nostrils are connected in the pharynx to a "Y" on the end of a short endotracheal tube of large diameter. This is accomplished with ease, and provides an airway through the nose greater in cross section than a No. 10 Magill catheter.

4. The apparatus is illustrated both before assembly and in use.

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