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A CASE FOR TRACHEOSTOMY

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The commonest indication for tracheostomy in the past has been mechanical obstruction of the respiratory tract in the region of the larynx and upper trachea. This operation is often performed as an emergency, in the presence of anoxia, and carries a high mortality, which is usually associated with the circumstances of the operation rather than with the operation itself.

During the past 10 years the frequency with which tracheostomy has been performed has increased considerably and there are now several other indications for which tracheostomy has to be considered.

Obstruction to ventilation may result from excessive secretions collecting in the bronchial tree. This collection of secretions occurs in patients who are unable to cough effectively or who are unable to swallow the secretions which collect in the pharynx. It may be present with varying severity in poliomyelitis, tetanus, unconsciousness, in disease of or injury to the nervous system, and after extensive surgical procedures. The value of tracheostomy in these cases lies in the facility with which secretions may be aspirated from the bronchial tree, and the assurance that a clear air-way will be maintained notwithstanding uncoordination of the muscles which normally maintain the functional patency of the entrance to the lower respiratory tract.

The above-mentioned pathological conditions are on occasions also associated with a decreased breathing capacity. For example, the excursion of the 'respiratory bellows' may be decreased in poliomyelitis because of weakness of the diaphragm or intercostal muscles, while in tetanus reduced breathing capacity will accompany spasm or exhaustion of these muscles. Tracheostomy reduces the resistance to breathing and permits effective ventilation to be carried on at a greater reduction in breathing capacity than when the respired gases have to be drawn through the nose or mouth, because of the elimination of half the 'dead-space' volume which occurs after tracheostomy.

Table I shows the indications and frequency of 155 consecutive tracheostomies performed at the University and

TABLE I. THE INDICATIONS FOR 155 CONSECUTIVE TRACHEOSTOMIES PERFORMED AT THE UNIVERSITY AND CITY HOSPITALS, CLEVELAND, OHIO, OVER A 5-YEAR PERIOD¹

	1948	1949	1950	1951	1952	Total
Poliomyelitis	0	0	7	5	39	51
Neoplasms	2	11	7	6	9	35
Laryngotracheitis ..	5	8	1	1	7	22
Miscellaneous	2	1	0	10	6	19
Central-nervous-system disease	0	0	2	6	11	19
Central-nervous-system injury	0	0	0	3	6	9
Total	9	20	17	31	78	155

TABLE II. SHOWING THE ABSOLUTE AND RELATIVE INCREASE OF TRACHEOSTOMY PERFORMED FOR SECRETIONAL VENTILATORY OBSTRUCTION AT THE BROOKE ARMY HOSPITAL, HOUSTON, TEXAS, OVER 8½ YEARS²

	Mechanical Obstruction		Secretional Obstruction	
	No. of tracheostomies	% of total	No. of tracheostomies	% of total
1947.. ..	9	100	0	0
1948.. ..	12	92	1	8
1949.. ..	13	93	1	7
1950.. ..	16	76	5	24
1951.. ..	17	48	18	52
1952.. ..	20	44	26	56
1953.. ..	22	42	31	58
1954.. ..	29	37	50	63
1955 (6 months) ..	9	23	31	77

City Hospitals, Cleveland, Ohio.¹ Table II show the increase in number of tracheostomies performed for secretional ventilatory obstruction compared with the number of tracheostomies performed for mechanical ventilatory obstruction in a series of 310 consecutive tracheostomies performed at the Brooke Army Hospital, Houston, Texas over 8½ years.²

The indications and technique for tracheostomy will vary from place to place and it is not intended to review these in detail but to mention briefly some aspects of the problems involved. Although acute ventilatory obstruction is apparent to the observer, chronic respiratory obstruction by tumours, stenosis or retained secretions may show less obvious signs of respiratory distress, nor may cyanosis be present. Prolonged under-ventilation will cause a respiratory acidosis which, with chronic mild hypoxia, produces a condition in which only very brief periods of additional respiratory obstruction are sometimes fatal to the patient.² This condition is therefore to be diagnosed in its earliest stages and an elective operation performed.

In cases of secretional obstruction a general anaesthetic delivered by an endotracheal tube with a high concentration of oxygen allows a more deliberate and a safer operation than if the procedure is carried out under local analgesia, where a deliberate procedure may easily end as an emergency stab 'with the patient livid and the blood like tar'.^{3, 4} When a mechanical obstruction is present, intubation may well be considered imprudent and a local analgesic used for the operation.

With regard to the technique, the isthmus of the thyroid is better divided and a segment of the anterior tracheal wall excised. These measures provide a safer and easier re-entry to the airway should the cannula be removed by accident or should it have to be replaced during the first few days.²

CASE REPORT

A Bantu female aged 23, was admitted with head injuries received in an assault. She was conscious, but investigation showed a very large comminuted, open, depressed fracture of the frontal bone, bilateral depressed fractures of the malar bones, and a fractured mandible.

An operation was performed under local analgesia supplemented with intramuscular pethidine and chlorpromazine. Un-

attached bony fragments were removed, consisting mainly of frontal bone and including the right supra-orbital ridge, orbital plate, and anterior and posterior walls of the frontal sinuses. A large rent in the dura mater was repaired with a fascial graft.

After closure it was noted that bubbles of air were coming through the suture line on top of the head on expiration, and that the whole area of skin in this region would lift on expiration. A tracheostomy was performed under local analgesia and the phenomenon described ceased.

Post-operatively the patient made an uneventful recovery. She was treated with sulphadiazine and erythromycin for 12 days and the affected area was irrigated gently with penicillin solution through two polythene tubes left in position for 3 days. The tracheostomy tube was removed after 2 weeks.

Comment

The possibility that infection may spread to the meninges and brain from the frontal sinus or upper respiratory passages after extensive fractures of the anterior cranial fossa is very real. In addition to repairing the dura mater it was a reasonable procedure to perform tracheostomy in order to avoid the constantly changing pneumatic pressures in the nose which occur during respiration and coughing, and so allow the tissues in this region to heal with as little disturbance as possible.

SUMMARY

The increasing frequency in the use of tracheostomy is noted and a variety of indications mentioned. A case is recorded in which tracheostomy was performed as an aid to the repair and healing of fractures of the anterior cranial fossa where a direct communication was found to exist between the sub-arachnoid space and the nasal cavity.

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