

from the day of operation, and was delivered of a normal full term female infant without incident. At this time her wound was firmly healed and she had no symptoms or complaints referable to her back or lower extremities.

"This appears to be the first recorded instance of spinal epidural abscess arising as a complication of spinal puncture. It seems reasonable to assume that as a result of the repeated insertions of the spinal puncture needle a hematoma formed in the epidural space at the site of puncture, or sufficient injury was done to the inter-spinal ligaments to provide a necrotic area in which, subsequently, a septic embolus from the dental route abscess lodged. The long interval between the spinal puncture and the onset of symptoms, and the absence of leptomeningitis make it unlikely that the infecting organisms were introduced by the spinal puncture needle. . . . Without surgical drainage, acute spinal epidural abscesses are almost invariably fatal, and even with such drainage the mortality has in the past been high. . . . The survival with good functional recovery which followed in the two cases which I have operated upon may be attributed to three factors: (1) prompt and adequate laminectomy when the diagnosis was made; (2) the free use of postoperative transfusions as a supportive measure; and (3) intensive chemotherapy before and after operation." 5 references.

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MOUSEL, L. H., AND LUNDY, J. S.: *Some Pulmonary Problems Related to Anesthesia*. Southwestern Med. 25: 166-169 (June) 1941.

"Preliminary medication may be responsible for the development of pulmonary complications during the induction stage of anesthesia, during surgical anesthesia or during the postoperative period. If excessive

premedication has been given, a great deal of difficulty may be encountered in anesthetizing the patient. Respirations may be so shallow that it is impossible to administer enough of the anesthetic agent to the patient to produce relaxation unless the anesthetic is administered by artificial respiration. On the other hand, if the patient has had an insufficient amount of preliminary sedation, he may inhale the anesthetic well but will require considerably more ether than the one who has been prepared adequately. Morphine may depress the respiration sufficiently during and immediately after operation so that an anesthetic such as ether is expelled very slowly from the lungs. This might be partly responsible for an increase in the incidence of post-operative pneumonia. It is of particular advantage under such circumstances to allow the patient to breathe 5 per cent carbon dioxide and 95 per cent oxygen in order to eliminate the ether as rapidly as possible, for once the ether has been eliminated, the patient is usually no longer depressed. . . .

"During spinal anesthesia, whether it is used alone or in combination with intravenous anesthesia, respiration must be watched closely, for anoxemia may develop and may be unrecognized until it advances to a point where it may terminate fatally regardless of one's efforts to combat it. This situation is essentially a pulmonary problem occurring as a result of the spinal anesthetic paralyzing the intercostal muscles and the intravenous anesthetic paralyzing the respiratory center. One must recognize the decrease in volume of respiration rather than wait for respiration to stop entirely, for if such a point is reached, the outcome may well be fatal. The treatment is the early administration of oxygen, perhaps by artificial respiration, that is, by intermittent compression of the bag containing the oxygen. . . . The routine postoperative administration of mor-

phine may be a dangerous procedure after rectal administration of avertin with amylene hydrate. . . . The depression may be so severe that dangerous anoxemia will develop. . . .

"Deep pentothal sodium anesthesia presents a definite pulmonary problem. If a sufficient amount of pentothal sodium is given to permit a major abdominal operation the respiratory center will be depressed and respirations will be very shallow. Under such circumstances the patient will be ventilated insufficiently by air alone. A high concentration of oxygen should be administered to all patients who are anesthetized deeply with pentothal sodium. . . . There is a tendency for respiratory obstruction to develop during pentothal sodium anesthesia unless the jaw is sustained. This is an important problem from the standpoint of pulmonary ventilation during intravenous anesthesia. In minor operations a paper butterfly may be used so that one cannot fail to see whether pulmonary exchange is taking place. . . .

"General anesthesia may be necessary for surgical operations on patients who present tracheal obstruction. If general anesthesia is to be used, an intratracheal tube should be inserted to insure a free airway. Subglottic obstruction may be due to a lesion which may lie immediately above the bifurcation of the trachea. If such a lesion exists, the anesthetist must be sure that the intratracheal tube is long enough to reach beyond the point of obstruction. Oral intubation should be used in such cases in order that one may be sure the intratracheal airway has been passed beyond the obstructing lesion. If an obstruction occurs in the larynx, it may be necessary to perform tracheotomy and to insert a small intratracheal tube through the tracheotomy opening so that the inhalation anesthetic may be administered. If a patient who has had continuous laryngeal obstruction is to be operated on

and the obstruction is relieved abruptly, sudden release of the increased pulmonary pressure may be responsible for some degree of pulmonary edema with an accumulation of a frothy secretion in the lungs and trachea. If this condition develops, the secretion should be aspirated from the trachea and bronchi immediately and oxygen should be administered by positive pressure until the pulmonary edema disappears. . . .

"The presence of solid materials, blood, vomitus or mucus may produce respiratory obstruction. Obstruction due to solid materials is usually sudden; obstruction due to the presence of blood, vomitus or mucus usually is insidious in its development. Glottic obstruction may be due to the bilateral adduction of the vocal cords through reflexes set in motion by the presence of anesthetic vapors in such concentration as to be irritating to the patient. Many pulmonary problems during anesthesia occur as a result of the addition of ether to nitrous oxide and oxygen in such concentrations that the patient is unable to inhale the mixture. . . . Supraglottic obstruction may be caused by the presence of foreign material such as tobacco, gum, broken teeth or dentures. Obstruction may be caused by the presence of enlarged tonsils, scarring of the throat from previous operations, an enlarged and edematous uvula, nasal obstruction or an enlarged and swollen tongue. If fluids accumulate in the respiratory passages during anesthesia, they should be removed immediately. Fluid material can be removed easily from the nasal passages and pharynx by means of suction through an ordinary urethral catheter. If fluids or foreign materials have accumulated in the trachea, the glottis should be visualized by the use of a laryngoscope and the foreign materials should be aspirated from the trachea through a catheter. Laryngospasm during pentothal sodium an-

esthesia is fairly common. The reflexes of the throat seem to become hyperactive during light pentothal sodium anesthesia. The presence of mucus, blood or other foreign materials in the throat during pentothal sodium anesthesia is likely to cause severe laryngospasm. . . .

"We feel that many postoperative pulmonary complications can be prevented by the aspiration of all free fluids from the patient's airway. This is done most easily by passing a suction catheter through an intratracheal tube. . . . Pulmonary complications, such as atelectasis, brought about by the presence of mucus in a bronchus can be relieved usually by bronchoscopic aspiration. In operations on the chest, especially for bronchiectasis or other productive pulmonary diseases, in which lobectomy or pneumonectomy has been carried out, we feel that the patient's lungs should be aspirated thoroughly in order to prevent atelectasis, pneumonitis or pulmonary abscess from developing in the dependent lung. During certain operations on the upper part of the abdomen or on the kidney the surgeon may open the pleural cavity accidentally. In such instances the anesthetist should be prepared to administer gases to the patient under positive pressure so that the lungs are entirely expanded at the time the surgeon closes the pleura. Positive pressure should be used on all patients who are undergoing lobectomy or pneumonectomy. If pulmonary ventilation is inadequate after an operation, oxygen may be administered through an oxygen mask, by nasal catheter or by an oxygen tent. The tent has the advantage of conditioning the atmosphere surrounding the patient. If the patient's respiration is depressed, he should be turned from side to side frequently. He should be encouraged to cough and breathe deeply in order to minimize the possibility of develop-

ment of atelectasis or pulmonary edema. . . .

"Patients who suffer from intractable asthma are often relieved by the administration of 80 per cent helium and 20 per cent oxygen. . . . Occasionally, severe attacks of asthma can be relieved by the administration of ether and oil by rectum. We have used small doses of pentothal sodium in anesthetizing a few asthmatic patients during mild attacks of asthma. The attacks have been relieved. The probabilities are that pentothal sodium anesthesia is not contraindicated for most asthmatic patients. Inadequate pulmonary ventilation is sometimes due to the inability of the patient to breathe deeply because of a painful wound in the upper part of the abdomen. We have tried the infiltration of a combination of 5 and 10 per cent metycaine in peanut oil in an attempt to minimize the abdominal pain. We have felt that in some instances the patient had little or no pain for a period as long as twenty-four hours. Other patients seem to get no more relief from metycaine and oil than they would have obtained from procaine hydrochloride. The splinting effect of pain in the upper part of the abdomen was shown by work done by Lemon who demonstrated that even tight binders used in dressings of wounds in the upper part of the abdomen would interfere with pulmonary ventilation to such an extent that postoperative complications would develop." 5 references.

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MACINTOSH, R. R., AND MENDELSSOHN, K.: *The Quantitative Administration of Ether Vapour*. *Lancet* 2: 61-62 (July 19) 1941.

"An anaesthetic which is in the gaseous state at N. T. P. can be administered in any desired quantity or concentration, by regulating the measured