

methods is not always suitable or convenient, and so the administration of an inhalation anaesthetic is required. . . . Nitrous oxide itself is neither ignitable nor explosive and its use (by itself) in an X-ray department is entirely safe. The difficulty with it is that it is a somewhat weak anaesthetic and can seldom be relied on to give the relaxation and sometimes even the immobility for the purpose required. . . . Although it will not itself burn, it will, under suitable conditions, support the ignition of other inflammable gases as much as or even more than oxygen itself. . . . The lesson to be learned from this is, that although nitrous oxide is in itself free from all danger of ignition, yet if combined with an ignitable vapour, such as that of ether, the combination may be as combustible as a mixture of ether vapour with air or even oxygen. . . .

"Ether vapour is, of course, highly ignitable, and at certain strengths mixtures of air (or oxygen) with ether vapour are highly explosive. As with other similar vapours, the degree of first ignitability and then of explosibility depends on the percentage of the mixture. . . . So if we could only be sure that we were using an ether vapour either too strong or too weak to ignite, its employment in the presence of a spark or flame would be quite safe. As a matter of practice, of course, we could never be sure of any such thing. . . . What I have said of ordinary ether—ethyl ether—is equally true of vinyl ether or vinesthene. With chloroform the conditions are entirely different. By no means that I am aware of, and certainly under no conditions known in the practice of anaesthesia, can chloroform be made to catch fire or explode. As far as this question is concerned, the use of chloroform in an X-ray department is entirely safe. . . . Its safe administration demands skill, experience, and very close observation.

. . . To give chloroform again in an X-ray department where absolute or semi-darkness may be the rule is simply courting trouble. So you will see that in spite of its freedom from all explosion dangers I am not recommending the indiscriminate use of chloroform in X-ray departments. . . . Ethylene . . . as regards explosions . . . is anything more dangerous than ether. Cyclopropane . . . is as explosive as ethylene and must never be used if there is the slightest danger of ignition. Ethyl chloride . . . is very inflammable. . . . The only other anaesthetic to which I wish to draw your attention is trichlorethylene, which is now generally known under the trade name of Trilene. . . . From our present point of view its great charm is that, unlike all the other newer agents, it is neither ignitable nor explosive. I must admit, however, that since its use became general some workers have found that under certain conditions of high temperature it can be made to ignite. Further work on this subject is in progress, but I am inclined to believe that the conditions necessary for ignition are so exceptional that as far as use in X-ray departments is concerned they may be neglected. . . . Unless the absence of any spark or other source of ignition can be absolutely guaranteed, no ignitable anaesthetic of any kind can be safely used in an X-ray department."

J. C. M. SC.

MOCK, H. E., AND TANNEHILL, E. H.: *Fractured Pelvis Complicated by Gangrene of Extremity—Amputation under Refrigeration Anesthesia*. Surg., Gynec. & Obst. 78: 429-433 (Apr.) 1944.

"Rarely is the complication of gangrene of the lower extremity following fractures of the pelvis mentioned in the literature on this subject. The fact that one of the authors has had the

unusual experience of helping in the management of 2 such cases within the period of approximately 1 year justifies this report. The additional fact that refrigeration of the affected extremities was utilized for a considerable period prior to amputations and that eventually the amputations were performed under refrigeration anesthesia should arouse further interest in these 2 cases. . . . The authors believe that, in the case of amputations, refrigeration of the gangrenous extremity will hold infection and a spreading moist gangrene in abeyance, thus giving a period of days or weeks in which to get the patient in condition to withstand the ordeal of amputation. Eventually, the amputation can be performed under refrigeration anesthesia without shock and without possible general anesthetic complications. In our experience even spinal anesthesia is not altogether devoid of shock. By the refrigerating of the extremity, thereby holding the gangrenous process in abeyance in the more distal portions, time is gained for the development of a certain amount of collateral circulation. Thus, amputations which otherwise might seem necessary high in the thigh may eventually be limited to more distal portions." 12 references.

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MARSHALL, J. M.: *Postoperative Pulmonary Atelectasis*. U. S. Nav. M. Bull. 42: 601-606 (Mar.) 1944.

"It is rather generally agreed that the primary causes of postoperative atelectasis are insufficient pulmonary ventilation and inadequate endobronchial drainage. The fundamental factors however are painful, splinted chest expansion, excessive viscosity of the bronchial secretions, and inability of the patient to eliminate these secretions. . . . The pathologic physiology of pulmonary atelectasis is . . . easily understood. There is mucus in the

bronchial tube. It is allowed to accumulate because of incomplete chest expansion, which effects incomplete lung aeration and suppresses the cough reflex. Finally the thick mucus plugs a bronchus. The plugged bronchus, according to Carlson and Luckhardt and others, then goes into spasm which further increases the obstruction. As no more air can enter the segment of lung involved, the air already there is quickly absorbed into the blood stream. Hence a negative pressure is created in the involved lung affecting the respiratory excursion on that side of the thorax. The heart and mediastinal structures are retracted toward the involved side, the diaphragm is pulled upward and the intercostal spaces are narrowed. Should bacterial contamination occur around and behind the plug, postoperative pneumonia becomes inevitable. Thus the importance of early recognition of atelectasis is apparent. . . .

"Inasmuch as excessive bronchial secretion is a major factor, every effort should be made to obtain adequate tracheobronchial drainage prior to surgery. Elective operations should be postponed in the presence of an acute upper respiratory infection. In the presence of a bronchitis or bronchiectasis the secretion should be reduced to a minimum before surgery is undertaken. The anesthetic of choice should be the one which abolishes the cough reflex and interferes minimally with the muscles of respiration. The Trendelenburg position during and immediately after operation aids in the gravity drainage of bronchial secretions and helps to guard against the aspiration of regurgitated gastric contents. Frequently changing the position of the patient in bed during the first few postoperative days reduces the likelihood of this complication. Since atropine and hyoscin^{um} tend to dry secretions, making them more tenacious and