

ALEVAIRE® AS AN ADJUNCT FOR PREVENTING PULMONARY COMPLICATIONS AFTER THORACOTOMY (A COMPARATIVE STUDY OF 200 CASES) * † ‡

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RETAINED respiratory tract secretions are among the many problems in the postoperative care of the patient who has undergone thoracotomy. In the past two years we have been able to study 200 such patients who survived thoracotomy. In 171 cases the operation was intracardiac, in 16 cases resection of one or more lobes or pneumonectomy was performed, and in the remaining 13 cases surgery was performed on the great vessels or inoperable malignant disease in the thorax was found.

Each patient received general anesthesia consisting of intravenous procaine, intravenous pentothal®, and positive pressure nitrous oxide-oxygen. Until April 1953, 118 patients were treated in the usual manner postoperatively, with frequent aspirations of the respiratory tree, both into the oral pharynx and on occasion into the trachea by catheter. Bronchoscopy was used as indicated in the opinion of the attending surgical, medical, and resident staff. Tracheotomy was performed on only two patients, which is not of sufficient incidence to be considered. No alevaire® was used in these 118 cases.

In April, 1953, the opportunity arose to use the respiratory detergent, alevaire, in an effort to reduce the frequency and severity of the complications of retained respiratory secretions. As far as we are aware there has been no comparative study of the effect of the routine postoperative use of alevaire in patients who have undergone thoracotomy. The previously published reports deal with the use of such agents in the medical management of children, adults, and elderly patients (1-13).

The alevaire which was used in this study has the following formula:

Superinone® Triton® WR-1339)	0.125%
Sodium bicarbonate	2%
Glycerin	5%

Superinone is an alkylaryl polyether alcohol, an oxyethylated tertiary octylphenol-formaldehyde polymer.

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At the beginning of the study, the patients were given inhalation of alevaire by an intermittent technique in which the detergent was nebulized in a DeVilbiss No. 40 nebulizer by oxygen or by a hand compressed bulb for forcing room air. There were only nine cases in this group and the results are not considered of any importance for that reason. We found that in order to be practical for the postoperative patient, it was necessary to run the mixture continuously. A somewhat crude arrangement for doing this was devised and diagrammatically shown in figure 1. The drug is nebulized with oxygen and the end of the nebulizer adapted to a nasopharyngeal catheter. In this way the patient receives the oxygen, which is routine on our service, and at the same time receives continuous detergent therapy. We attempted to use forty-eight hours from the completion of opera-

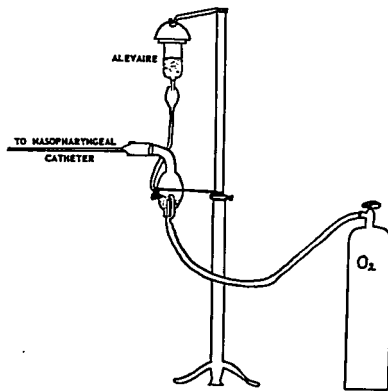


FIG. 1.

tion as the routine time on continuous alevaire inhalations, although this could not be carried out in every case due to other difficulties in the immediate postoperative period. In the average case, less than 500 cc. of alevaire was used for the forty-eight hour treatment.

With so many variables as exist in human beings, and the many additional factors which arise in cases of pulmonary or cardiac surgery, it is indeed difficult to evaluate the effect of any one procedure or treatment on the postoperative course. Bronchoscopy is a definitive procedure, but the frequency with which it is performed varies with the thinking of the moment in a field in which thinking changes frequently because of its youth. Despite these limitations, and for lack of a better yardstick, the incidence of bronchoscopy in our patients who survived surgery to leave the hospital alive has been tabulated.

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Routine preoperative and one or more postoperative chest X-rays were made in every case. Changes in the postoperative films which indicated disease of the lung parenchyma have also been tabulated. Since some pleural reaction, as expressed by effusion or thickening, almost always follows thoracotomy in the immediate postoperative period, pleural changes have been omitted. Bearing in mind these modifying factors, one sees from table 1 that the incidence of parenchymal pulmonary complications was 11 per cent in patients routinely given alevaïre against 23.6 per cent in those given humidified oxygen. Similarly, the incidence of bronchoscopy was 7 per cent in those treated routinely with alevaïre and 13.5 per cent in those not given this therapy. We see, therefore, that the incidence of pulmonary complications and definitive treatment is approximately twice as great in the untreated patient as it was in the treated patient. It should be noted that all 200 patients in this series were treated in the same manner except for

TABLE 1
INCIDENCE OF PULMONARY COMPLICATIONS AND TREATMENT IN 200 CONSECUTIVE PATIENTS WHO SURVIVED THORACOTOMY

No. of Cases	Oxygen with Respiratory Detergent		Plain Oxygen	
	82		118	
	No.	%	No.	%
X-ray positive for parenchymal lung disease	9	11.0	28	23.6
Bronchoscopy	6	7.3	16	13.5

inhalation of alevaïre with their oxygen. Not counted in the tabulation as more than one bronchoscopy, but probably of significance, is the fact that two of the patients who did not receive detergent inhalations had to undergo bronchoscopy twice, whereas none of the patients given this treatment needed more than one such aspiration.

No objective ill effects were noted in the treated patients. A few complained of a disagreeable taste or odor, but this never forced discontinuance of alevaïre. It would appear from this that the routine use of alevaïre nebulized in oxygen materially reduces the parenchymal pulmonary complications of thoracotomy.

SUMMARY AND CONCLUSIONS

Two hundred consecutive patients who successfully underwent thoracotomy for cardiac, pulmonary, or other interpleural operation have been studied for respiratory complications. Eighty-two of these patients received continuous oxygen with nebulized alevaïre for the

first forty-eight hours after operation. The remaining 118 had continuous humidified oxygen by the same route. There was no other variant in the postoperative management.

The incidence of parenchymal pulmonary complications in the alevaire-treated patients was 11 per cent; in those not given this respiratory detergent it was 23.6 per cent. Six of the 82 patients given alevaire required bronchoscopic aspiration of retained secretions (7.3 per cent), and 16 of the 118 not given this therapy required it (13.5 per cent).

It is concluded from this preliminary study that the routine use for the first hours after thoracotomy of continuous alevaire therapy materially reduces the parenchymal pulmonary complications of thoracotomy for cardiac, great vessel, pulmonary or other intrathoracic surgery.

ADDENDUM

Since completing this study, we have adopted the DeVilbiss No. 840 nebulizer for alevaire. It is used in the same manner, but with much greater convenience.

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