

Original Article

Post-pneumonectomy thoracic drainage: to drain or not to drain? A retrospective study*

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ABSTRACT

Objective: To evaluate the need for post-pneumonectomy thoracic drainage. **Methods:** This was a retrospective study of 46 patients having undergone pneumonectomy in the Thoracic Surgery Department of the Londrina University Hospital between January of 1998 and December of 2004. Patients were divided into two groups: those having been submitted to drainage and those not having been. The diseases involved were lung cancer, bronchiectasis and tuberculosis. **Results:** Drainage was used in 21 patients, whereas no drainage was used in 25. The most common postoperative complication was subcutaneous emphysema (12 cases). Hospital stays were of shorter duration among patients who were not submitted to drainage than among those who were (mean, 6.5 days vs. 10.2 days). No serious postoperative complications were observed in the group of patients not submitted to drainage. **Conclusion:** The findings that evolutions were more favorable and hospital stays were shorter for the patients not submitted to drainage call into question the need for routine post-pneumonectomy drainage.

Keywords: Drainage; Pleural cavity; Pneumonectomy; Postoperative care; Postoperative complications; Retrospective studies

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INTRODUCTION

The issue of whether or not to perform postpneumonectomy thoracic drainage of the pleural space remains a point of controversy in the field of thoracic surgery.⁽¹⁾

According to some authors,⁽²⁾ "the majority of surgeons do not advocate routine postpneumonectomy drainage", since it has been observed that the mediastinum can be controlled with simple needle aspiration or by introducing a small intrathoracic catheter during the surgical procedure.

The first pneumonectomy used to treat bronchial carcinoma was performed in 1933.⁽³⁾ It was followed by thoracoplasty, and a drain was left in the residual cavity. In that same year, a surgeon⁽⁴⁾ performed two thoracic drainage-free pneumonectomies with good evolution.

In 1935, another surgeon⁽⁵⁾ performed eight drainage-free pneumonectomies with good results, aspirating the pleural cavity in a controlled manner using a manometer. This surgeon recommended that drainage be performed in cases of contamination of the cavity.

Pecora and Cooper, in 1995,⁽⁶⁾ followed by Laforet and Boyd in 1964,⁽⁷⁾ recommended a three-flask system of balanced postpneumonectomy drainage of the pleural cavity (Figure 1).

There are various options for managing the postpneumonectomy phase: using no drainage; performing simple needle pleural aspiration, when necessary, during the immediate postoperative phase (with or without a manometer);^(5,8-9) placing a small catheter into the pleural cavity when closing the thoracotomy and later removing it;⁽⁵⁾ draining the

pleural cavity using a water-seal drainage system with a clamped drain for a 24- or 48-hour period;⁽³⁾ and connecting the cavity drain to a three-flask balanced drainage system.⁽⁶⁻⁷⁾ Since the 1980s, the Londrina University Hospital Department of Thoracic Surgery has been performing two types of procedures following pneumonectomy: pleural cavity drainage using a clamped drain for two or three days; and no drainage of the pleural cavity. The evolution of these cases, together with a comparative analysis of these two types of procedures, is presented herein with the objective of improving the decision-making process when the question is whether or not to drain the pleural cavity.

METHODS

All patients who underwent pneumonectomy at the Londrina University Hospital between January of 1989 and December of 2004 were studied via a review of their medical charts. Patients were divided into two groups: those who were submitted to postpneumonectomy drainage; and those who were not. The surgical team was responsible for deciding which patients would be allocated to which group. The following variables were analyzed for both groups: age; underlying lung disease; major complications appearing by postoperative day 7; length of postoperative hospital stay; and outpatient evolution.

The descriptive and inferred analysis of the data was obtained using the Epi Info program, version 6.04b. The Student's t-test was used for purposes of comparing the two groups in terms of mean age and mean length of hospital stay. The chi-square test was used to compare categorical variables (gender, proportion of patients in each group, indications for the surgery, complications, and 30-day results) between the two groups. Two-tailed tests were used with the set at 5%. The study design was approved by the Ethics in Research Committee of the University Hospital of Londrina State University.

RESULTS

A total of 46 subjects were examined, 21 (45.7%) of which were submitted to thoracic drainage and 25 (54.3%) of which were not (Figure 2).

The mean age was 47.3 ± 16.2 years (45 ± 19.1 years in the group submitted to drainage vs. 47.2 ± 21.1 years in the group not submitted to drainage; $p = 0.689$).

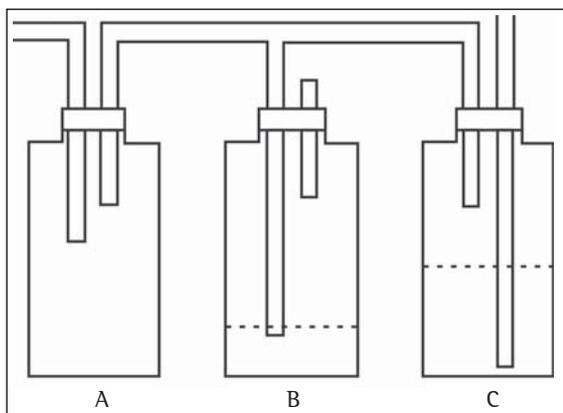


Figure 1 - Representation of balanced drainage in a postpneumonectomy pleural space⁽⁶⁾

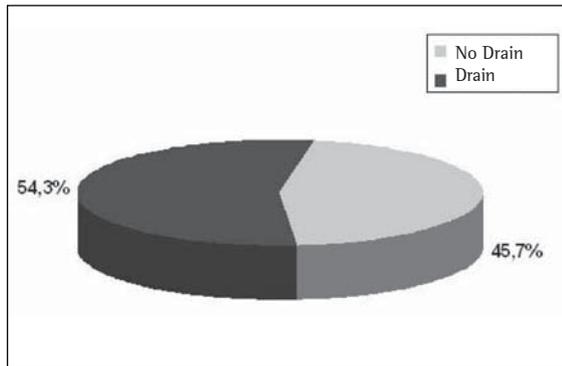


Figure 2 - Patient distribution in terms of drainage or no drainage ($p = 0.291$)

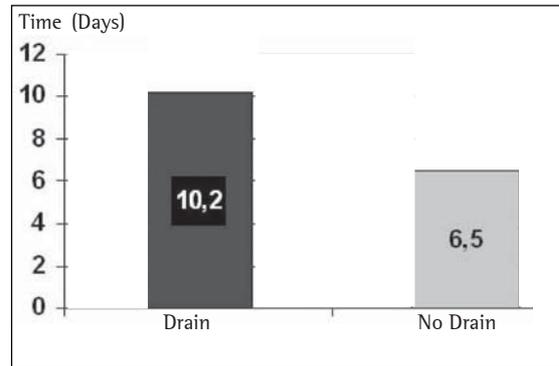


Figure 3 - Length of postoperative hospital stay ($p = 0.172$)

Operated patients were diagnosed with the following underlying diseases: neoplasia (45.7%); tuberculosis (24.7%); and bronchiectasis (19.6%). Among the 25 patients not submitted to thoracic drainage, the indications for surgery were as follows: neoplasia (in 15 patients); tuberculosis (in 5 patients); and bronchiectasis (in 5 patients). Among the 21 patients not submitted to thoracic drainage, the indications for surgery were as follows: neoplasia (in 6 patients); tuberculosis (in 11 patients); and bronchiectasis (in 4 patients). No statistically significant differences were found between the groups in terms of the type of disease that led to the pneumonectomy being indicated ($p = 0.199$).

Despite the fact that each group was treated by a different surgical team, care and follow-up treatment were similar, differing only in the aspect of pleural cavity drainage.

Operative complications appeared by postoperative day 7 in 15 patients (32.6%), subcutaneous emphysema being the most common complication (4 cases in the group submitted to drainage and 8 cases in the group not submitted to drainage). Mediastinal deviation was observed in 2 patients who had not been submitted to drainage. This condition improved after the patients had undergone relief puncture. One patient who had been submitted to drainage developed an intracavitary clot that had to be removed surgically.

The number of days of drainage ranged from one to six (mean, 3.9 ± 1.4 days). The mean length of the postoperative hospital stay was 6.5 days in the group not submitted to drainage and 10.2 days in the group submitted to thoracic drainage (Figure 3).

No deaths had occurred by postoperative day 30.

DISCUSSION

There is no consensus on whether or not it is advisable to perform postpneumonectomy drainage of the pleural space. Among the events deemed alarming are postoperative hemorrhage, preoperative or intraoperative contamination of the pleural space, and dehiscence of the bronchial stump.

Authors who defend not inserting a drain claim that patients not submitted to drainage present favorable postoperative evolution, and that, in some patients submitted to drainage, the drain remains clamped, which is, in practice, equivalent to not inserting a drain. In the case of balanced cavity drainage, in addition to the difficulty related to early ambulation, there is also a risk that the three balanced flasks will not be properly assembled and maintained.^(2,6,8-9)

In the patient sample studied, the mean age was practically the same in both groups. In addition, the frequency of drainage was similar. These facts facilitated the comparison between the groups.

The underlying diseases that led the patients to become candidates for surgery were also analyzed. The diseases observed were neoplasia, bronchiectasis, and tuberculosis. Tuberculosis was slightly more common in the patients submitted to drainage, whereas neoplasia was more common in those not submitted to drainage. The virtually homogeneous characteristics of the studied population allowed for a viable comparison. In analyzing complications occurring by postoperative day 7, we found that subcutaneous emphysema was the most common complication in both groups: 4 cases among those submitted to drainage and 8 cases among those not submitted to drainage.

In a major review of 291 bronchial carcinoma-related pneumonectomies,⁽²⁾ postoperative pulmonary edema was observed in 11 patients (9%) of the 134 submitted to standard drainage, whereas among 157 patients not submitted to drainage or submitted to a balanced drainage, only 2 (1.2%) displayed postpneumonectomy edema ($p = 0.009$). In a recent article, other authors⁽¹⁰⁾ referred to drainage as a possible etiology for postpneumonectomy pulmonary edema. None of the patients evaluated in the present study presented this complication.

Relief punctures were performed in 2 of the patients not submitted to thoracic drainage. In the postoperative phase, we observed radiographic evidence of a slight deviation of the mediastinum toward the remaining lung in patients submitted to thoracic drainage. However, this did not result in any significant hemodynamic alterations.

The complications were practically the same in both groups. The most serious complication, an intracavitary clot that had to be surgically removed, occurred in a patient in the group that had been submitted to drainage.

The evolution was generally favorable. By postoperative day 30, no deaths had occurred. In studying the length of the hospital stay in these patients, we observed that the average postoperative hospital stay for patients not submitted to drainage was 6.5 days, shorter than the 10.2 days observed for patients submitted to drainage. However, this difference was not significant. Apparently, patients who had not been submitted to drainage experienced less postoperative pain and ambulated sooner.

The outpatient monitoring of these patients did not provide evidence of any alteration in one group in relation to the other, and none of the patients presented postpneumonectomy syndrome. The favorable evolution of 25 patients not submitted to postpneumonectomy drainage, together with the fact that hospital stays were shorter among those

patients than among those submitted to drainage, leads us to question the need for routine postpneumonectomy drainage of the pleural cavity, even in instances of great pleuropulmonary adhesences, such those occurring in cases of tuberculosis, which increase the risk of postoperative bleeding.

In view of the absence of a consensus and the lack of comparative studies in the literature analyzed, the experience of the staff at the Londrina University Hospital might inspire further studies on whether or not to perform postpneumonectomy drainage of the pleural cavity.

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