

Capitonnage or not? Which is the best operative technique for hydatid cysts of the lung; when should it be performed?

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SUMMARY.

OBJECTIVES. Echinococcosis is a biological, medical, economic and social issue of great importance. This study was undertaken because differing opinions have been expressed about the most successful method of surgical treatment of pulmonary echinococcal cysts. **METHODS.** The medical records of 181 patients with pulmonary hydatidosis treated in University Hospital of Lung Diseases were investigated retrospectively, of which 145 (80.1%) were treated surgically and the others conservatively. Of the patients, 93 (51.4%) were male and 88 (48.6%) were females, with a mean age of 40 years (range 12-80 years). In 31.1% of cases, the cysts were intact and in 68.9% complicated. The data were analyzed statistically using the Anova and Chi- square tests. **RESULTS.** Only a few of the cases treated surgically had complications (34.8%), mainly air leakage (>7 days), but there were no fatalities. The mean number of days of postoperative hospitalization for all the surgical cases was 12.8 ± 3.73 . The mean number days of postoperative hospitalization for cases where capitonnage was applied was 11.38 ± 4.6 and the duration of air leak was 4.51 ± 2.89 days. There was no statistically significant association between surgical method and postoperative hospitalization. **CONCLUSIONS.** We concluded that the use of capitonnage offered no advantage concerning the days of hospitalization, and that its application is not the best choice in the surgical treatment of pulmonary echinococcosis. We also concluded that as complicated hydatid cysts prolong the hospitalization of the patients, it is better to treat them surgically at an early stage. *Pneumon 2011, 24(2):177-181.*

INTRODUCTION

Echinococcosis is a biological, medical, economic and social concern of great importance. Albania is positioned in a geographical area that is well

known for its high incidence of this disease, as are other countries in Balkan and Mediterranean areas.

Echinococcosis is a parasitic infection that in the human body involves the liver and lungs but also other sites, usually as a complication of infection. In Albania the annual incidence of this disease is 2.48 per 100,000. Pulmonary echinococcosis is encountered more frequently in our clinic in the University Hospital of Lung Diseases in Tirana, with approximately 18 cases per year being treated with surgical intervention.¹

Echinococcosis of the lung is often associated with echinococcosis of the liver or other abdominal organs. The hydatid cysts of the lung (Figure 1) seen in our cases vary in diameter from 1 cm to 16 cm, and they were located in all lung lobes. In the majority of cases, especially when the cysts are intact, the clinical picture is indefinite and the patient may complain of heaviness on the side where the cyst is located, or a dry cough. When the cysts are complicated the patient may present with expectoration of cyst contents, dyspnoea, fever, and in many cases haemoptysis, or an allergic reaction that can culminate in Quince's oedema.²⁻⁸

The treatment of this disease, including all the different forms of appearance of pulmonary hydatid cysts, based on the experience of our clinic, has been successful.

OBJECTIVES

To determine whether capitonnage is a useful surgical procedure in the appropriate management of echinococcosis of the lung, and to investigate the possible

association between complications and the duration of hospital stay of these patients.

MATERIAL AND METHODS

During the period 1st January 2000 to 1st January 2009 181 patients were admitted to the University Hospital of Lung diseases of Tirana, with the diagnosis "Pulmonary echinococcosis", of which only 145 (80.1%) were treated surgically. The other cases for reasons that were objective (other underlying disease that was an absolute contra-indication to intervention, e.g., acute myocardial infarct) or subjective (fears about the intervention) were treated conservatively, with albendasol and, depending on the case, antibiotics.⁸ The series reported here included 93 males (51.4%) and 88 females (48.6%) with a mean age of 40 years (range 12 to 80 years) (Figure 2).

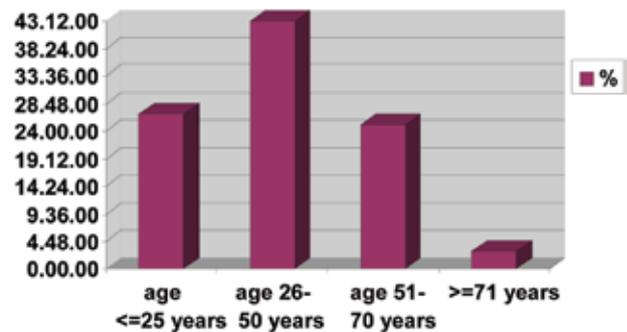


FIGURE 2. Distribution of cases of patients admitted with pulmonary echinococcus according to age (n=181).

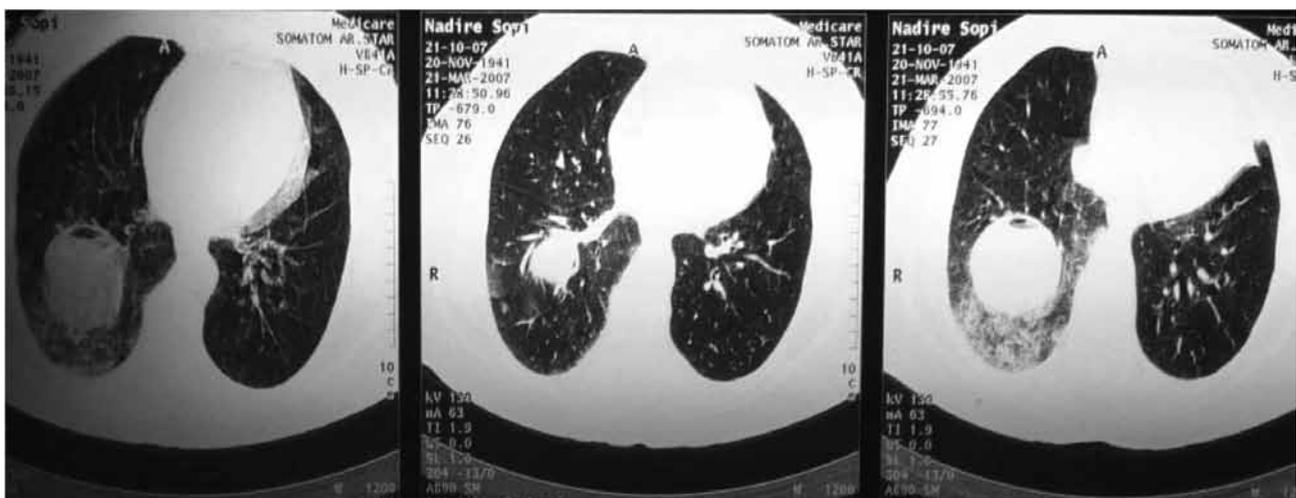


FIGURE 1. The predominant radiological image of lung echinococcosis.

Most of the patients were initially hospitalized in the pulmonary clinics and after diagnosis transferred to the Thoracic Surgery Clinic. The duration of follow-up of the patients who underwent surgery ranged from 6 months to 9 years. Three cases (1.7%) with recurrent echinococcosis are not reported in the data for the second intervention.

Complications (Figure 3) occurred in 125 (68.9%) of the cases that were hospitalized, including: infected cysts, hydropneumothorax, haemoptysis, calcification of the empty cysts and recurrent echinococcosis.⁸

In these cases positional polymorphism of the hydatid cysts is observed, the lesion affecting one or both lungs, with one or more cysts, and also affecting the adjacent tissues such as the pleura, mediastinum and diaphragm, but also other organs, including the liver and spleen (Figure 4).

Statistical Analyses

The data collected were analyzed in the statistical programme Statistical Package for Social Sciences (SPSS version 17.0).

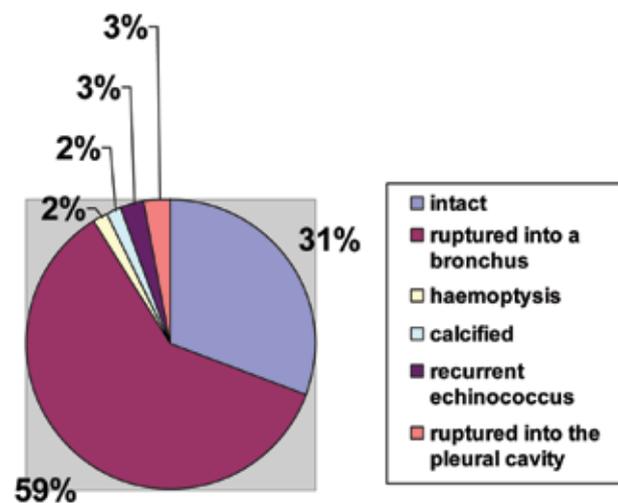


FIGURE 3. Mode of presentation of cases of pulmonary echinococcosis (n=181).

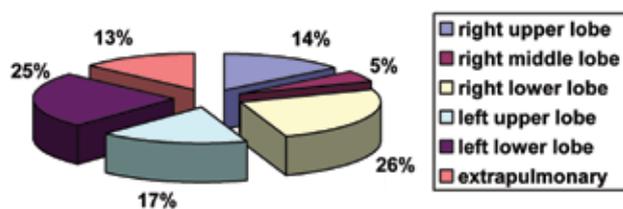


FIGURE 4. Distribution of pulmonary hydatid cysts (n=181).

The descriptive statistics included frequency (numbers and corresponding percentages) for categorical variables and reporting of central tendency sizes and size dispersion of numerical variables.

The Anova test was used to assess the association between a categorical and numerical variable. The Chi-square test was used to assess the associations of categorical variables. The Kaplan Meier survival method was used to compare the duration of air leak between three surgical techniques.

For all statistical tests, values of $P < 0.05$ were considered statistically significant.

Operative technique

In order to perform the surgical procedure, depending on the case, left or right postero-lateral thoracotomy was performed in the fifth intercostal space.

In one case with bilateral echinococcal cysts the procedure was performed through a sternotomy and in three cases right thoraco-laparotomy was performed for echinococcus of the right lung and liver.

In our clinic we have performed various different operative techniques to treat hydatid cysts of the lung.

One technique aims to empty the cyst with the help of a trochar, followed by a partial resection of the pericystic area and fistuloraphy and capitonnage of the remaining cavity. This technique was performed in 49 cases (27.1%).⁹⁻¹⁸

The second technique aims to discharge the contents of the cyst with a trochar followed by a wide resection of the pericystic area and the surrounding pulmonary parenchyma, leaving free the basement of the cavity after the fistuloraphy is made. This technique was performed in 77 cases (42.5%).⁹⁻¹⁸

In a few cases, when the echinococcus cysts are small and intact, enucleation is performed, after which we can continue with one of the techniques described above (often capitonnage). This technique accompanied by capitonnage was performed in 12 cases (6.6%).⁹⁻¹⁸

When the cysts are very large and the parenchyma near them is severely affected we have performed lobectomy or lingulectomy. This technique was applied in 7 cases (3.9%).⁹⁻¹⁸

These techniques are applied under conditions of protection of the surgical area using wet gauzes soaked in a 10% solution of NaCl.

The surgical techniques described above have been used by all the surgeons of our clinic. It was the decision of each surgeon to perform the procedure considered to be most appropriate at the time of surgery.

RESULTS

Among the cases treated surgically only a few had complications (34.8%), mainly air leakage (>7 days) and there were no fatalities (Figure 5).

The mean number of days of hospitalization for all the surgical cases was 17.33 days ± 7.076. The postoperative duration of hospitalization was 12.8±3.729 days.

The mean number of days of hospitalization for the cases where capitonnage was applied was 16.61±7.129, the duration of air leak was 4.51±2.888 days, and the mean number of days of postoperative hospitalization was 11.38±4.6.

Regarding the cases where the technique of leaving free the basement of the cystic cavity was applied, the mean number of days of hospitalization was 18.22±7.31 days and the duration of air leak was 4.42±2.117 days, and of days of postoperative hospitalization 13.9±7.5.

For the cases where enucleation was applied, associated with capitonnage, the mean hospital stay was 14.5±4.011 days and the duration of air leak was 5.50±2.844 days, with a mean number of days of postoperative hospitalization of 12.9±7.5.

In the cases where lobectomy was applied, the mean hospital stay was 17.33±7.076 days, the duration of air leak was 4.54±2.479 days, and the mean number of days of postoperative hospitalization was 11.9±3.454.

The mean number of days of hospitalization for complicated cysts was 18.46±7.3 and for intact cysts 14.7±5.4.

The confidence interval (CI) was 95%, which means that 95% of surgical cases were hospitalized for a duration of 14.9-18 days.

Anova testing showed that there was no statistically significant association between the surgical method and either the postoperative hospital stay (p=0.064) or duration of air leakage (p=0.132), but that preoperative complications were correlated with the total duration of hospital stay (p=0.035).

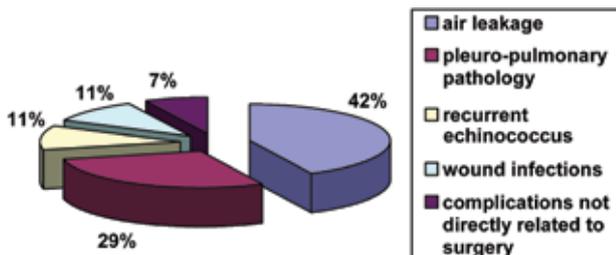


FIGURE 5. Postoperative complications in 35% of 145 patients treated surgically for pulmonary hydatid cysts.

Chi-square testing showed no statistically significant association between the surgical technique and the kind of postoperative complication (p=0.834).

The cases were grouped according to the duration of air escape (<5 days and >5 days). No statistically significant difference was demonstrated between the three surgical techniques [i.e., 1) cystectomy accompanied with capitonnage, 2) cystectomy not accompanied with capitonnage and 3) lung anatomical resection] with regard to a duration time of >5 days of air escape: Logrank test p-value = 0.1 (Figure 6).

DISCUSSION

Various different opinions have been expressed in the relevant literature about the most successful technique for the treatment of pulmonary echinococcal cysts.

Research has shown that 73-75% of patients respond to medical management to some degree, but the reported cure rates are only 25-30%,^{19,20} and this strategy is a long and tedious process that carries considerable risk. Anthelmintics weaken the cyst wall, thus increasing the likelihood of cyst rupture. Wen and Yang²⁰ found a 77.3% incidence of cyst rupture in 21 patients with hydatid disease who were treated with albendazole.

The patients in the present series with complicated cysts had higher morbidity and a longer hospital stay. Safioleas and colleagues¹⁸ reported the same hospitalization trend in 42 patients with pulmonary hydatidosis, specifically, a 12-day median stay for non complicated cases compared with a 21-day median stay for complicated cases.

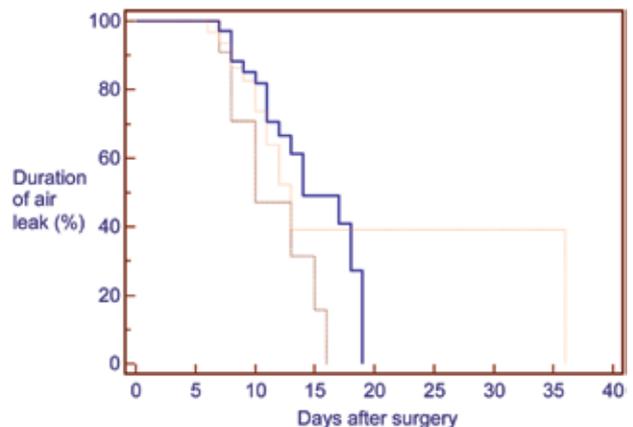


FIGURE 6. Kaplan Meier survival method showing duration of post surgical air leakage in patients with pulmonary echinococcus.

Kusucu and colleagues⁸ concluded that surgery is the primary mode of treatment for patients with pulmonary hydatid disease. Complicated cases have higher rates of preoperative and postoperative complications and require longer hospitalization and more extensive surgical procedures than uncomplicated cases. This underlines the desirability of immediate surgery for any patient who is diagnosed with pulmonary hydatidosis.

Demirleau and Pernot in 1951 recommended the closure of the residual cavity of the cysts with capitonnage.⁹

In an evaluation of the procedure, Saidi in 1976 concluded that the application of capitonnage is not useful because it causes obliteration of the pulmonary parenchyma and the surface of lungs in the area of the residual cavity was covered by the pleura.^{10,11,21-24}

Celik in 2000 demonstrated that the application of the capitonnage had no advantages in the surgical treatment of pulmonary echinococcus, and on the contrary it might cause harm by closure of the bronchus near the cyst.^{10,11,21-24}

The present study was conducted to demonstrate the success or disadvantage of the technique.

CONCLUSIONS

We conclude that the use of capitonnage did not offer any advantage regarding the duration of hospitalization of the patients, and thus its application is not the best choice in the surgical treatment of pulmonary echinococcosis.

We also conclude that complicated hydatid cysts prolong the duration of hospitalization, and consequently it is better for patients to be treated surgically at an early stage, before complications develop.

Conflicts of interest

There is no conflict of interest for the co-authors of this article

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