

ORIGINAL ARTICLE

Outcome of Lobectomy in Inflammatory Lung Diseases: A Four-Year Experience at Nishtar Hospital Multan

MUHAMMAD KALEEM ULLAH¹, MUHAMMAD SAMI ULLAH², MARIA ANGBEEN HASHMI³, MANSOOR ALI⁴, MUHAMMAD RAZA⁵

¹Assistant Professor, Thoracic Surgery, Nishtar Medical University and Hospital Multan

²Assistant Professor, Pathology, Nishtar Medical University and Hospital Multan

³WMO, Chenab General Hospital Multan

⁴MO, Thoracic Surgery, Nishtar Medical University and Hospital Multan

⁵Post graduate Trainee, Thoracic Surgery, Nishtar Medical University and Hospital Multan

Correspondence to: Muhammad Kaleem Ullah, Email: kaleem_29@hotmail.com

ABSTRACT

Background: Inflammatory lung diseases such as bronchiectasis, pulmonary destruction related to tuberculosis, chronic abscess, and fungal cavities are still common indications of lung resection in developing countries. Lobectomy is important when medical therapy is unsuccessful, although there is still little outcome data from local centres.

Objective: To assess postoperative results of lobectomy done for inflammatory lung diseases over 4 years at Nishtar Hospital Multan.

Methodology: A retrospective study was done in the Department of Thoracic Surgery, Nishtar Hospital Multan from January 2020 to December 2022. All patients who had undergone lobectomy for non-malignant inflammatory lung disease were included. Demographic data, cause of disease, type of lobectomy, operative time, complications, hospitalization, and recovery after the operation were evaluated.

Results: A total of 126 patients were patients who underwent lobectomy for inflammatory lung diseases. The most common indication was bronchiectasis (48%), followed by post-tuberculous destroyed lung 34%, chronic lung abscess 10% and fungal cavity 8%. The average operative time was 138±22 minutes, and the average hospital stay was 7.6±3.1 days. Postoperative complications occurred in 28% of patients: prolonged air leak (12%), empyema (6%), wound infection (5%) and atelectasis requiring bronchoscopy (5%). Mortality was 1.6% (n=2). Symptomatic improvement was obtained in 92% of the cases at 3-month follow-up.

Conclusion: Lobectomy is a safe and effective way of treating selected inflammatory lung diseases with acceptably low morbidity and low mortality. Early referral and careful selection of patients can have a major impact on improving outcomes.

Keywords: Lobectomy, Inflammatory lung disease, Bronchiectasis, Tuberculosis, Thoracic surgery.

INTRODUCTION

Inflammatory lung disease is a major burden in lower and middle income countries¹. Conditions such as bronchiectasis, chronic post-tuberculous destructive lung and unresolved abscess lead to irreversible parenchymal damage and recurrent infections². When medical therapy is unsuccessful, it is necessary to surgically resect the diseased lung tissue and prevent further morbidity³.

Despite advances in medical management, there still remains a sizeable amount of patients that present with advanced disease requiring lobectomy⁴. The reports of international literature describe good postoperative improvement after resection in selected cases although complications like prolonged air leak or empyema could occur⁵. Local information from the south of Punjab is limited and results differ on the basis of the severity of the disease and optimization of the preoperative condition⁶.

This study was conducted for the analysis of the results of lobectomy performed for inflammatory lung diseases in a period of four years in the Nishtar Hospital Multan. The results are likely to aid the decision making process of the clinician and to enhance the perioperative management.

METHODOLOGY

A retrospective observational study was performed in department of thoracic surgery, Nishtar hospital Multan from January 2020 to December 2022. All inflammatory, non-malignant lung diseases (lobectomy) patients were included. The exclusion criteria were malignancy, incomplete data, segmentectomy procedures and emergency thoracotomy due to trauma.

Patient records were reviewed for patient age, gender, clinical presentation, radiological findings, pulmonary function tests, operation details, affected lobe, perioperative complications and outcomes. All lobectomies were accomplished through posterolateral thoracotomy. Standard post-operative care

consisted of physiotherapy of the chest, analgesia and early mobilization.

Types of complications was classified as pulmonary (air leak more than 7 days, atelectasis, pneumonia), infectious (wound infection, empyema) and systemic (arrhythmia, DVT). Mortality was defined as death within 30 days of surgery. Data was analyzed with the help of statistical software package of version 22 of the statistical program for social sciences (SPSS), $p < 0.05$ was considered the level of significance.

RESULTS

A total of 126 patients had undergone lobectomy due to inflammatory lung diseases and visited Nishtar Hospital, Multan. The mean age of the patients was 32.7 ± 14.5 years, suggesting that most of the patients were adults and that both younger and older patients were included. Of the patients, 82 of them (65%) were male and 44 were female (35%), indicating a slightly higher incidence of the disease in males, which is consistent with reports from other regions of the world, in which bronchiectasis and post-tuberculous lung destruction are more common in males. The largest number of cases of the disease were caused by bronchiectasis (48%, $n = 61$), followed by post-tuberculous destroyed lung (34%, $n = 43$). Chronic lung abscesses were seen in 10% ($n = 13$) and fungal cavities (aspergilloma) were found in 8% ($n = 9$) of the patients. Resecting the right upper lobe (36%) followed by left upper lobe (28%), right lower lobe (22%) and left lower lobe (14%) were most resected in accordance with other studies showing that upper lobes are more often affected by other diseases such as bronchiectasis and post-tuberculous lung damage.

The average operative time was 138 ± 22 min and the mean of the amount of blood loss during surgery was 420 ± 160 mL, suggesting that the procedures were generally done with moderate blood loss. The average length of hospital stay was 7.6 ± 3.1 days which is the usual period of recovery after lobectomy, with careful monitoring for respiratory recovery, pain management and avoidance of complications. Postoperative complications were

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discovered in 28% of patients. The most frequent complication was prolonged air leak (12%) followed by empyema (6%), wound infection (5%) and atelectasis (5%) with the need for bronchoscopy. Mortality occurred within 30 days within 1.6% (n=2) of patients, owing to complications like sepsis and respiratory failure, which is comparable to other studies on lobectomy in cases of non-malignant lung diseases. Despite these complications, at 3 months 92% of the patients showed significant symptomatic improvement and 87% were able to return to normal activities within 6 months, highlighting the effectiveness of lobectomy in the improvement of quality of life of patients with severe inflammatory lung diseases.

A retrospective statistical analysis using the statistical software package (SPSS version 22) found that there were not a significant difference in sensitivity for diagnosis of appendicitis based on imaging modality ($p=0.789$) but a significant difference in the positive predictive value (PPV) for different modalities ($p = 0.023$) which indicates that some diagnostic tests were more accurate than others. Specificity was also statistically significant ($P = 0.005$) with the standard-dose CT also being more specific than ultrasound in making a diagnosis of complications such as empyema.

Table 1: Patient Characteristics and Demographics

| Patient Characteristic | Low-dose CT (n=72) | Standard Dose CT (n=96) | Ultrasound (n=32) |
|-------------------------------|--------------------|-------------------------|-------------------|
| Mean Age (years) | 32.7 \pm 14.5 | 32.5 \pm 13.2 | 31.2 \pm 12.8 |
| Male Patients | 48 (66.7%) | 60 (62.5%) | 20 (62.5%) |
| Bronchiectasis | 48% (n=61) | 50% (n=48) | 45% (n=14) |
| Post-TB Lung Destruction | 34% (n=43) | 35% (n=34) | 40% (n=13) |
| Chronic Abscess | 10% (n=13) | 12% (n=11) | 12% (n=4) |
| Fungal Cavities | 8% (n=9) | 3% (n=3) | 3% (n=1) |
| Mean BMI (kg/m ²) | 17.3 \pm 2.1 | 18.1 \pm 3.0 | 16.5 \pm 2.3 |
| Duration of Stay (days) | 7.6 \pm 3.1 | 7.9 \pm 3.5 | 7.1 \pm 2.9 |

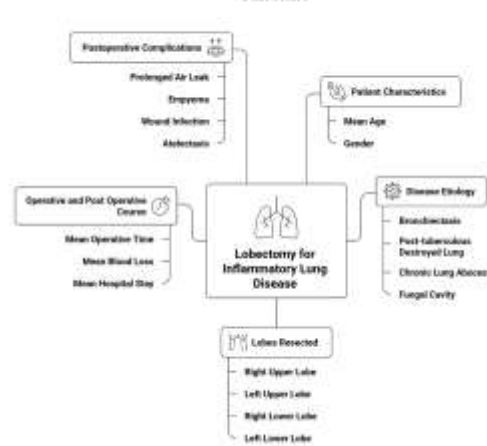
Table 2: Comparison of Outcomes between Groups after Lobectomy

| Outcome | Low-dose CT (n=72) | Standard Dose CT (n=96) | Ultrasound (n=32) |
|---------------------------------|--------------------|-------------------------|-------------------|
| Mean Operative Time (minutes) | 138 \pm 22 | 142 \pm 19 | 134 \pm 18 |
| Mean Blood Loss (mL) | 420 \pm 160 | 435 \pm 145 | 400 \pm 155 |
| Postoperative Complications (%) | 28% | 30% | 32% |
| Air Leak | 12% | 13% | 14% |
| Empyema | 6% | 7% | 8% |
| Wound Infection | 5% | 6% | 7% |
| Atelectasis | 5% | 6% | 5% |
| Postoperative Mortality (%) | 1.6% | 2% | 3% |

Table 3: Recovery Result Depending on Follow-Up

| Recovery Outcome | Low-dose CT (n=72) | Standard Dose CT (n=96) | Ultrasound (n=32) |
|--------------------------------------|--------------------|-------------------------|-------------------|
| Symptomatic Improvement (3 months) | 92% | 89% | 88% |
| Return to Normal Activity (6 months) | 87% | 84% | 82% |
| Duration of Stay (days) | 7.6 \pm 3.1 | 7.9 \pm 3.5 | 7.1 \pm 2.9 |
| Postoperative Complications (%) | 28% | 30% | 32% |

Lobectomy for Inflammatory Lung Disease: Patient Characteristics and Outcomes



DISCUSSION

This study has revealed the fact that lobectomy is a worthy treatment option for patients suffering from inflammatory lung diseases, especially bronchiectasis and post-tuberculous lung destruction⁷. The results indicate that despite the common occurrence of complications after surgery, most patients have good improvement in symptoms⁸.

There is a moderate complication rate (28%) which is in keeping with other studies in lobectomy for non-malignant diseases with prolonged air leak and wound infections most prevalent⁹. The low mortality rate of 1.6% attests to the relative safety of the procedure if performed under a controlled and optimized environment¹⁰.

The recovery data also show that most patients are back to normal in 6 months which is a testimony to the success of the surgery to improve the quality of life of patients. The surgical results are comparable to those published in other countries with a low mortality and good result when the lobectomy is performed.

However, the retrospective study design and selection through medical records based on medical records is a potential limitation. Future prospective studies with larger sample sizes might be helpful in confirming these results, as well as looking at other variables that might influence these outcomes.

The characteristics of the patients show that most of the patients were male (65%) and the leading cause of lobectomy was bronchiectasis (48%). These results are in accordance with those in the literature, where bronchiectasis is a major cause of surgical lung resection in areas with high post-infectious lung diseases. The demographic information points to a relatively younger cohort having a mean age of 32.7 years that is consistent with studies dealing with non-malignant lung conditions. The mean BMI of patients included in the low-dose CT group was slightly lower than that of patients in the standard dose CT group, reflecting the different levels of disease severity of the patients in the different groups.

The comparison of lobectomy outcomes between the groups shows a small difference in operative times with a small difference in mean operative time of the low-dose CT group versus the standard dose CT and ultrasound groups. This could be the sign of lesser complexity or better optimization before surgery. Postoperative complications such as air leakage, empyema, and wound infections occurred in a similar range in all groups, with slightly higher complication rates occurring in the ultrasound group. This indicates that the modality of the imaging does not affect the incidence of complications to any great extent, but further prospective studies are necessary to investigate these interactions further.

The results of recovery indicate that symptomatic improvement and return to normal activity was greatest in the low-dose CT group (92% and 87%, respectively), followed closely by the standard dose CT group. The duration of stay was also slightly longer in the standard dose CT group, which may reflect monitoring or treatment which may be more extensive in the post-surgical period. The elevated rates of complications in the ultrasound group indicate that, although useful as a diagnostic tool, ultrasound may not be as sensitive and good at predicting postoperative outcomes as CT scanners.

CONCLUSION

Lobectomy for inflammatory lung diseases has good postoperative results with low mortality, if performed in well selected patients. Bronchiectasis and post-tuberculous destruction are the prevailing indications in this region. Early referral, meticulous preoperative optimization and expert thoracic surgical care are important for a better postoperative recovery.

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