Original Article

Practice patterns and trends in surgical treatment for chronic lung infections: a survey from the Brazilian Society of Thoracic Surgery

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Background: Chronic lung infections represent a diversity of clinical entities that combined respond to significant public health, particularly in developing countries. However, there is no data regarding the practice patterns, surgeons' preferences, and technological usage, especially among Brazilian surgeons, in the setting of the surgical treatment of chronic lung infections. We, therefore, surveyed Brazilian thoracic surgeons from the Brazilian Society of Thoracic Surgery (SBCT) about practice patterns and trends in surgical treatment for chronic lung infections.

Methods: A cross-sectional anonymous survey of all thoracic surgeons from the Brazilian Society was conducted in 2019. As the study was purely descriptive no further statistical evaluation was performed.

Results: The responsive rate was 34% (259/766) from 23 of the 26 states in Brazil. A total of 141 (54.4%) participants reported their institution as a surgical reference for chronic infection lung disease, only 13.1% of surgeons have a high-volume service (more than 11 cases operated annually). The majority (76.2%) of respondents performed 1–5 surgical resection to treat tuberculosis (TB) sequelae, but only 62 (30.1%) had performed more than one resection to treat active TB. Chronic lung infection (76%) and hemoptysis (66%) were the most common symptoms as surgical indications. A proportion of 42.2% of the respondents do not have and/or perform routine drug sensitivity tests. In addition, 19.3% of respondents were not familiar with the recommendations of surgery in the treatment of pulmonary TB. Video-assisted thoracoscopic surgery (VATS) is available for 80% of respondents, while robotic surgery is for only 10%. Most (86%) surgeons have access to surgical staplers. Among the structural resources, respiratory isolation beds in the intensive care unit (ICU) (80%) and ward (79%) are frequently available resources. However, less than 12% of surgeons have in their institution a specific operating room for sputum-positive patients.

Conclusions: Lung resection for chronic infectious disease is an essential area of activity for thoracic surgeons in Brazil, which occurs mainly in the public sphere, with no concentration of cases per surgeon or institution. The lack of adequate resources in many centers justifies the creation of reference centers for improving care for these patients.

Keywords: National survey; lung resection; surgical outcomes; infectious disease; non-cystic fibrosis bronchiectasis

Submitted Jan 24, 2023. Accepted for publication Jul 10, 2023. Published online Jul 31, 2023.
doi: 10.21037/jtd-23-111
View this article at: https://dx.doi.org/10.21037/jtd-23-111

Introduction

Chronic lung infections represent a diversity of clinical entities that combined respond to significant public health concerns due to their increasing prevalence, illness severity, and substantial economic burden on the healthcare system particularly in developing countries (1,2). The most important etiologies are non-cystic fibrosis bronchiectasis, tuberculosis (TB), fungal infections, cystic fibrosis, and immunoglobulin deficiencies (3). In Brazil, TB indeed represents the most crucial etiology due to its high incidence, 31.6 cases/per 100,000 people in 2020, placing Brazil among the high-burden countries for TB (4).

Until recently, chronic lung infections were considered an orphan and essentially neglected disease from a surgical therapeutic standpoint. However, over the last few decades, recent data about the results of adjuvant surgical treatment in the scenarios of drug-resistant TB (5), as well as nontuberculous mycobacteria (6) and fungal infections (7), had restored thoracic surgery to a prominent position as a therapeutic option for these patients. Another important indication for surgery in the chronic pulmonary infections setting is the treatment of complications like hemoptysis and repeated infections; lung resection, in these cases can not only solve these complications but also restore the patient's quality of life (8).

The surgical treatment of pulmonary infections usually is highly complex which can be demonstrated by the relatively high complications rate (9). Thoracic surgeons need to be familiar with all aspects of lung disease, the patient's clinical condition, and the technological and human resources available in their service and their region. The decision to use adjuvant resection must be taken in the light of reliable data, making it essential to carry out studies that show the current scenario of thoracic surgery in the context of infectious diseases. However, to our knowledge there is no data regarding the practice patterns, surgeons' preferences, and technological usage, especially among Brazilian surgeons, in the setting of the surgical treatment of chronic lung infections. This information could help not only surgeons to perform these operations better but also the clinician to indicate and health care managers to guide their decision about this relevant group of diseases.

We, therefore, surveyed Brazilian thoracic surgeons from the Brazilian Society of Thoracic Surgery (SBCT) about practice patterns and trends in surgical treatment for chronic lung infections to improve our understanding of the status of real-world practice. We present this article in accordance with the SURGE reporting checklist (available at https://jtd.amegroups.com/article/view/10.21037/jtd-23-111/rc).

Highlight box

Key findings

- This study reviews the status of real-world surgical practice for patients with chronic lung infections in Brazil.

What is known and what is new?

- The surgical treatment of pulmonary infections usually is highly complex which can be demonstrated by the relatively high complications rate.
- This report is the first to elucidate current surgical treatment for chronic lung infections practice patterns and trends. The results suggested that more resources, including cutting-edge surgical technology and a multidisciplinary discussion, are not widely available, which could contribute for better surgical outcomes in these heterogeneous groups of patients.

What is the implication, and what should change now?

- The lack of adequate resources in many centers justifies the creation of reference centers allowing faster adoption of structural, human, and technological resources may represent an essential strategy for improving care for these patients.

Methods

A cross-sectional survey of all thoracic surgeons from the SBCT was conducted. A list of all active members of the SBCT was made available by the SBCT in 2019, and all thoracic surgeons received an electronic invitation to complete the questionnaire through the Research Electronic Data Capture (REDCap: hosted at the University of Sao Paulo) platform. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the local Institutional Review Board (Cappesq #15364819.2.0000.0065), and it was an official effort of the SBCT. The survey was anonymous, and all participants in this survey gave their consent to complete the survey.

Survey design

The survey encompassed 30 questions that explored the practice of lung resection for bronchiectasis. The questions focus on four different topics: (I) characteristics of the services; (II) surgical approach; (III) perioperative management; (IV) availability of technologies and difficulties encountered in the treatment of these

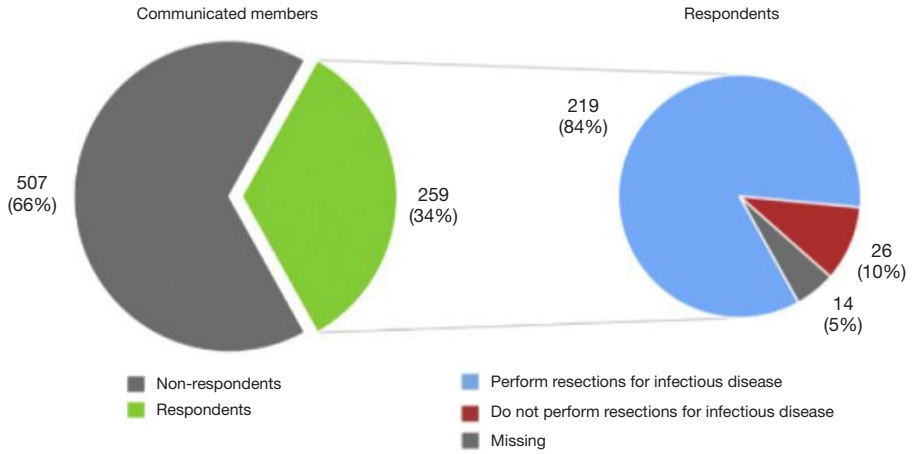

Figure 1 Survey response rate and geographic location of respondents.

pathologies (Appendix 1). As for the etiology, the question asked to the surgeons divided the etiologies into: Tuberculosis Sequelae (including sequelae with and without associated aspergillosis infection), Active Tuberculosis including Multidrug Resistant Tuberculosis, Mycobacteria Non-Tuberculosis and Bronchiectasis non-cystic fibrosis and not post-tuberculosis. There was no personal data exposure.

As the study was purely descriptive and no comparisons were made, no further statistical evaluation was performed.

Results

Demography

Of the 766 SBCT active members reported, 259 (34%) answered the survey from 23 of the 26 states in Brazil (*Figure 1*). Eighty-four percent of the surgeons [219] usually perform lung resection for chronic infectious lung disease. A total of 26 (10%) do not perform lung resection for chronic infectious diseases, and the reasons alleged are lack of referral or because it is not the institution's focus. The majority perform it in a public institution whether academic or assistance (*Table 1*). Although 141 (54.4%) participants reported their institution as a surgical reference for chronic infection lung disease, only 13.1% of surgeons have a high-volume service (more than 11 cases operated annually). Mostly (47.5%), operate 1–5 cases per year. The clinical specialty that most referred patients to surgical treatment was pulmonology (79.2%) followed by infectious disease specialists (48.3%) (*Table 1*).

The most common chronic lung disease was TB followed by non-cystic fibrosis bronchiectasis. Respondents who reported having performed resections due to TB sequelae, there was another question asking whether there was associated aspergillosis infection. A total of 206 participants answered the question: "How many operated cases had associated aspergilloma or cavitary chronic aspergillosis?". Of the respondents, 35 (17.0%) said they had none, while the majority, 155 (75.2%) said they had 1–5 resections. Only 16 respondents (7.8%) had more than 6 lung resections associated with pulmonary aspergillosis.

The majority (76.2%) of respondents performed 1–5 surgical resection to treat TB sequelae, but only 62 (30.1%) had performed more than one resection to treat active TB (*Table 2*). Mostly did not perform any surgery as an adjuvant treatment to nontuberculous mycobacteria in the period of 1 year. The responders reported that chronic lung infection (76%) and hemoptysis (66%) were the most common symptoms as surgical indications. Moreover, 142 participants (54%) also performed more than one surgical treatment to control general symptoms and improve quality of life.

Perioperative management

According to the perioperative planning of patients, 63 (24.3%) of the surgeons held a multidisciplinary board. In comparison, 83 (38%) reported following some protocol to improve surgical outcomes: 47 (21%) follow the nutritional optimization protocols and 36 (17%) follow the enhanced recovery after surgery (ERAS), which is a

Table 1 Characteristics of the services

Questions of the survey	N	%
In what type of institution are they held?		
Public teaching hospital	82	31.7
Public hospital	82	31.7
Privacy teaching hospital	9	3.5
Privacy hospital	51	20.0
Missing	35	13.5
Is the service considered a reference in the region for infectious disease?		
Yes	141	54.4
No	81	31.3
Missing	37	14.3
What is the number of resections performed in the year 2019?		
<1	4	1.54
1–5	123	47.5
6–10	61	23.6
11–15	20	7.7
>15	14	5.4
Missing	37	14.3
Which specialty referred the most patients to surgical treatment?		
Pneumology	205	79.2
Infectiology	125	48.3
Medical clinic	16	6.2
Basic health unit	16	6.2
Spontaneous demand	6	2.3
Others	8	3.1

Table 2 Approximate number of lung resections performed per indication annually

Indication	Number of lung resection				
	0	1–5	6–10	11–15	>15
Tuberculosis sequelae, n (%)	13 (6.3)	157 (76.2)	31 (15.0)	5 (2.4)	3 (1.5)
Non-cystic-fibrosis bronchiectasis and not secondary to TB, n (%)	53 (25.7)	137 (66.5)	16 (7.8)	1 (0.5)	2 (1.0)
Tuberculosis resistant (active infection), n (%)	149 (72.3)	60 (29.1)	2 (1.0)	0 (0.0)	0 (0.0)
Non-tuberculous mycobacteria, n (%)	165 (80.1)	46 (22.3)	0 (0.0)	0 (0.0)	0 (0.0)

TB, tuberculosis.

standardized perioperative measure aimed at decreasing postoperative organ dysfunction, facilitating recovery and achieved through the introduction of various evidence-based perioperative measures (10). It is a protocol that has been adopted by several services and specialties. Despite having been initially introduced in colorectal surgery, there are already studies showing good results in thoracic surgery as well (11,12). Preoperative evaluation is done mainly with cardiovascular risk assessment (86%) and lung function test (98%), but only 26.2% perform diffusion capacity of the

lungs for carbon monoxide (DLCO).

Among the preoperative care for patients specifically with TB, almost half of the respondents (42.2%) do not have and/or perform routine drug sensitivity tests. In addition, 19.3% of respondents were not familiar with the recommendations of surgery in the treatment of pulmonary TB and multidrug- and extensively drug-resistant TB, published by the World Health Organization (WHO) 2014, updated in 2016 (10,11). By contrast, 40% responded they were satisfied with the treatment offered to those patients and considered WHO recommendations (13,14).

Surgical approach

Video-assisted thoracoscopic surgery (VATS) is available for 80% of respondents, while robotic surgery is for only 10%. Most (86%) surgeons have access to surgical staplers to perform vascular, bronchial ligatures, and resection of the lung parenchyma. In-room bronchoscope to assist selective intubation is also available to 70% of the participants. Four percent of surgeons do not have any of those resources mentioned.

A total of 206 participants completed the questions about complications and their management. More than half 54.8% [142] had empyema after more than one lung resection. Of those who had empyema as a complication, 60.5% [86] reported that bronchial stump fistula was associated. Only 87 (42.2%) responders reported endoscopic treatment for bronchial stump fistula available in their institution. Despite the procedure's availability, 30 (14.5%) responders don't perform endoscopic interventions in those cases. The other 119 (57.7%) surgeons do not have this resource.

Regarding the treatment of the residual cavity in the postoperative period, the majority 59.7% [123] of respondents, do not perform the additional treatment to normal chest drainage. On the other hand, some preventive measures are performed intraoperatively by the participants, including 34 (16.5%) myoplasty, 43 (20.9%) thoracoplasty, 109 (53%) phrenic nerve block, 6 (2.9%) phrenic nerve section and 38 (18.4%) pneumoperitonea.

Availability of technologies and difficulties encountered in the treatment of these pathologies

Among the structural resources, respiratory isolation beds in the intensive care unit (ICU) (80%) and ward (79%) are frequently available resources. However, less than 12% of surgeons have in their institution a specific operating room for sputum-positive patients. Other available resources reported by the participants to improve the surgical outcomes of the patients were physiotherapy (82%) and pain control groups for the postoperative period (27%).

Discussion

This survey demonstrated that lung resection is performed by many thoracic surgeons in most states in Brazil and is still a public health problem. Despite most surgeons reporting a lack of resources in their institutions, the vast majority reported having access to minimally invasive surgery. Sequelae of TB are the most common indication reported by surgeons. On the other hand, many respondents still do not perform surgery as an adjuvant treatment for multidrug-resistant pulmonary tuberculosis (MDR-TB). This study reviews the status of real-world surgical practice for patients with chronic lung infections in Brazil. To the best of our knowledge, this is the first survey of lung resection for this etiology

Pulmonary resection due to infectious lung disease is an important activity for the Brazilian thoracic surgeon, mainly in the public sphere. In this survey, 84% of the participants usually perform lung resection for chronic infectious lung disease. However, there is a decentralization of the number of cases per surgeon/or institution due to the fact that only 13.1% are at a high service volume. The creation of reference centers allowing greater adoption of structural, human, and technological resources may represent an essential strategy for improving the care of these patients, considering that almost half of the respondents (42.2%) do not have and/or perform routine drug sensitivity tests, which is highly recommended for these patients, and less than 12% of surgeons have in their institution a specific operating room for sputum-positive patients, which represents a breach in the health care protection measures.

Despite the unavailability of some resources, VATS is available for 80% of respondents. The use of VATS has increased worldwide, becoming the method of choice in the appropriate cases of malignant and benign lung disease (15). The feasibility of resection depends on the local anatomical situation, particularly inflammation and adhesions (16). The VATS was reported to be cosmetic, the postoperative pain and blood loss were significantly lower in the VATS treatment group, and the operation time was shorter than in a thoracotomy (17). In addition, shorter hospital stays and fewer complications in VATS patients were reported in another study (18). Fatal complications like bronchopleural

fistula and empyema may occur regardless of the surgical approach (19). However, we don't have any published studies regarding the results of the VATS approach in lung resections for inflammatory/infectious diseases in Brazil, which due to the heterogeneity of the disease could be very different from what is reported in the literature.

In this survey sequelae of TB is the most common indication for lung resection, this can be explained because of the emergence of drug-resistant strains of *M. tuberculosis*. Nonetheless, most surgical procedures in TB patients have been performed on a case-by-case basis, and current evidence is, therefore, from observational studies with a paucity of reliable data on the indications and surgical outcomes (20). Consequently, the 2014 WHO consensus statement stipulated that patients should receive at least 4–6 months of an appropriate anti-TB regimen before surgery (13). Moreover, the most recent WHO-MDR-TB guidelines, updated in 2016 (14), recommend partial lung resection in adjuvant with MDR-TB treatment. By contrast, about 23.9% of the respondents in this study were not aware of these published recommendations (14). It stands to reason that because respondents were not familiar with the indications and benefits of adjuvant lung resection, 70% do not perform any adjuvant surgical treatment for MDR-TB, which in the upcoming scenario of TB resistance increase is concerning.

This study has potential limitations that need to be considered when interpreting the results. Although our response rate is consistent with other electronic healthcare professionals' surveys (21,22), it can be considered low. Both the length of the questionnaire and the fact that it was sent electronically likely contributed to our low response rate. Furthermore, to our knowledge, there are no validated surveys for investigating specific surgical treatments for chronic infectious lung diseases for us to draw comparisons. Lastly since the responders, in most of the cases, do not have databases, the questions about surgical volumetry were responded by memory, obviously, some subjectivity is also present in the answers. To mitigate these limitations, we categorized the possible responses. Despite these limitations, we believe our study revealed the status of surgical treatment for chronic infectious diseases in Brazil: lacking resources, including cutting-edge surgical technology and a multidisciplinary discussion, are not widely available, which could contribute for better surgical outcomes in these heterogeneous groups of patients. This report is the first to elucidate current surgical treatment for chronic lung infections practice patterns and trends.

Conclusions

Lung resection for chronic infectious disease is an essential area of activity for thoracic surgeons in Brazil, which occurs mainly in the public sphere, with no concentration of cases per surgeon or institution. The lack of adequate resources in many centers justifies the creation of reference centers allowing faster adoption of structural, human, and technological resources may represent an essential strategy for improving care for these patients.

Acknowledgments

Funding: None.

Footnote

Reporting Checklist: The authors have completed the SURGE reporting checklist. Available at https://jtd.amegroups.com/article/view/10.21037/jtd-23-111/rc

Data Sharing Statement: Available at https://jtd.amegroups.com/article/view/10.21037/jtd-23-111/dss

Peer Review File: Available at https://jtd.amegroups.com/article/view/10.21037/jtd-23-111/prf

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://jtd.amegroups.com/article/view/10.21037/jtd-23-111/coif). AWM reports receiving honoraria for lectures from AstraZeneca and Merck Sharp & Dome. RMT reports personal fees from AstraZeneca, Medtronic, Roche, BMS, MSD, Takeda, and Intuitive. The other authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the local Institutional Review Board (Cappesq #15364819.2.0000.0065), and it was an official effort of the SBCT. The survey was anonymous, and all participants in this survey gave their consent to complete the survey.

References

1. Lawton KA. Management of bronchiectasis: a tertiary health care perspective. Adelaide, Australia: Adelaide Medical School, 2021.
2. Kutlay H, Cangir AK, Enön S, et al. Surgical treatment in bronchiectasis: analysis of 166 patients. Eur J Cardiothorac Surg 2002;21:634-7.
3. Balkanli K, Genç O, Dakak M, et al. Surgical management of bronchiectasis: analysis and short-term results in 238 patients. Eur J Cardiothorac Surg 2003;24:699-702.
4. Silva TO, Vianna PJS, Almeida MVG, et al. Street people in Brazil: a descriptive study of their sociodemographic profile and tuberculosis morbidity, 2014-2019. Epidemiol Serv Saude 2021;30:e2020566.
5. Fox GJ, Mitnick CD, Benedetti A, et al. Surgery as an Adjunctive Treatment for Multidrug-Resistant Tuberculosis: An Individual Patient Data Metaanalysis. Clin Infect Dis 2016;62:887-95.
6. Mitchell JD. Surgical Treatment of Pulmonary Nontuberculous Mycobacterial Infections. Thorac Surg Clin 2019;29:77-83.
7. de Oliveira VF, Viana JA, Sawamura MVY, et al. Challenges, Characteristics, and Outcomes of Chronic Pulmonary Aspergillosis: A 11-Year Experience in A Middle-Income Country. Mycopathologia 2022. [Epub ahead of print]. doi: 10.1007/s11046-022-00676-z.
8. Vallilo CC, Terra RM, de Albuquerque AL, et al. Lung resection improves the quality of life of patients with symptomatic bronchiectasis. Ann Thorac Surg 2014;98:1034-41.
9. Mariani AW, Vallilo CC, de Albuquerque ALP, et al. Preoperative evaluation for lung resection in patients with bronchiectasis: should we rely on standard lung function evaluation? Eur J Cardiothorac Surg 2021;59:1272-8.
10. Gustafsson UO, Scott MJ, Schwenk W, et al. Guidelines for perioperative care in elective colonic surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations. Clin Nutr 2012;31:783-800.
11. Batchelor TJP, Rasburn NJ, Abdelnour-Berchtold E, et al. Guidelines for enhanced recovery after lung surgery: recommendations of the Enhanced Recovery After Surgery (ERAS®) Society and the European Society of Thoracic Surgeons (ESTS). Eur J Cardiothorac Surg 2019;55:91-115.
12. Batchelor TJP. Enhanced recovery after surgery and chest tube management. J Thorac Dis 2023;15:901-8.
13. World Health Organization Regional Office for Europe. The role of surgery in the treatment of pulmonary TB and multidrug- and extensively drug-resistant TB. Copenhagen: World Health Organization Regional Office for Europe 2014.
14. World Health Organization. Guidelines for the programmatic management of drug-resistant tuberculosis. Geneva: World Health Organization; 2016.
15. Roviaro G, Varoli F, Rebuffat C, et al. Major pulmonary resections: pneumonectomies and lobectomies. Ann Thorac Surg 1993;56:779-83.
16. Gülhan SŞE, Acar LN, Sayılır Güven E, et al. Surgical treatment of bronchiectasis: Our 23 years of experience. Turk Gogus Kalp Damar Cerrahisi Derg 2020;28:629-37.
17. Zhou ZL, Zhao H, Li Y, et al. Completely thoracoscopic lobectomy for the surgical management of bronchiectasis. Chin Med J (Engl) 2013;126:875-8.
18. Zhang P, Zhang F, Jiang S, et al. Video-assisted thoracic surgery for bronchiectasis. Ann Thorac Surg 2011;91:239-43.
19. Baysungur V, Dogruyol T, Ocakcioglu I, et al. The Feasibility of Thoracoscopic Resection in Bronchiectasis. Surg Laparosc Endosc Percutan Tech 2017;27:194-6.
20. Tiberi S, Torrico MM, Rahman A, et al. Managing severe tuberculosis and its sequelae: from intensive care to surgery and rehabilitation. J Bras Pneumol 2019;45:e20180324.
21. Marchi E, Vargas FS, Madaloso BA, et al. Pleurodesis for malignant pleural effusions: a survey of physicians in South and Central America. J Bras Pneumol 2010;36:759-67.
22. Kim HC, Suzuki M, Lim HF, et al. Survey of the management of patients with bronchiectasis: a pilot investigation in Asian populations. Korean J Intern Med 2021;36:1402-9.

Cite this article as: Mariani AW, D'Ambrosio PD, Rocha Junior E, Gomes Neto A, Fortunato STL, Terra RM, Pêgo-Fernandes PM. Practice patterns and trends in surgical treatment for chronic lung infections: a survey from the Brazilian Society of Thoracic Surgery. J Thorac Dis 2023;15(8):4285-4291. doi: 10.21037/jtd-23-111

Supplementary

Portuguese version: Survey – Ressecção pulmonar em doenças infecciosas

Survey:

1- A maior parte das ressecções pulmonares (segmentectomia anatômicas, lobectomias, pneumonectomias) por doença infecciosa que você realiza são em instituição:
A) Pública assistencial.
B) Pública acadêmica.
C) Privada assistencial.
D) Privada acadêmica.
E) Não realizo ressecções pulmonares por doença infecciosa.

2- Qual foi o número aproximado de ressecções pulmonares (segmentectomias anatômicas, lobectomias, pneumonectomias) por doença infecciosa que você realizou nos últimos 12 meses?
Resp: numérica

3- Enumere conforme ordem de importância (número de casos encaminhados), a origem dos pacientes com doença pulmonar infecciosa que você atende para avaliação de tratamento cirúrgico:
(Possibilidades de resposta de 1 a 6 para cada item, não permitindo respostas duplicadas)
a) Pneumologia
b) Infectologia
c) Clínica médica
d) Unidade básica de saúde (sem especialidade especificada)
e) Demanda espontânea do paciente sem avalição médica prévia
f) Outras

4- O serviço em que realiza maior parte das suas ressecções por doença infecciosa pulmonar é considerado centro de referência para esse tratamento na sua região)?
a) Sim
b) Não

5- Quais dos recursos estruturais abaixo você dispõe e utiliza regularmente para atendimento aos pacientes com doença infecciosa pulmonar:
(Seleção múltipla de respostas)
a) Leito de isolamento respiratório em enfermaria
b) Leito de isolamento respiratório em UTI
c) Sala cirúrgica específica para pacientes bacilíferos
d) Centro de endoscopia respiratória
e) Ambulatório específico para atendimento de doenças infecciosas pulmonares
f) Serviço de retaguarda para internação prolongada de doentes
g) Serviço ambulatorial de nutrição
h) Serviço ambulatorial de fisioterapia

https://dx.doi.org/10.21037/jtd-23-111

6- Quais dos recursos abaixo você dispõe e faz uso regular durante o planejamento, preparo e recuperação dos pacientes com doença pulmonar infecciosa:
(Seleção múltipla de respostas)
a) Reunião multidisciplinar regular direcionada exclusivamente para discussão dos casos de doença infecciosa pulmonar.
b) Protocolos de otimização nutricional perioperatórios
c) Protocolos de ERAS
d) Fisioterapia motora e respiratório pós-operatória
e) Grupo de cuidados com estomas e feridas operatórias
f) Grupo de tratamento de dor crônica e/ou aguda pós-operatória

NO tocante a indicação você faz uso de algum protocolo : qual?

7- Na avaliação pré-operatória das ressecções pulmonares maiores (lobectomias e pneumonectomias) por doença infecciosa, você realiza obrigatoriamente (de forma protocolar) qual(is) dos exames abaixo:
(Seleção múltipla de respostas)
a) Prova de função pulmonar (espirometria)
b) Medida da capacidade de difusão pulmonar para monóxido de carbono (DLCO)
c) Ergoespirometria
d) Ecocardiograma transtorácico
e) Teste de caminhada de 6 minutos
f) Avaliação de risco cardiovascular
g) Não realizo nenhum exame pré-operatório de maneira obrigatória

8- Seu serviço dispõe (ou tem fácil acesso) e realiza de rotina teste de sensibilidade a drogas de primeira e segunda linha (DST) ou testes rápidos moleculares endossados pela WHO (por ex.: geneXpert) para os pacientes com tuberculose?
a) Sim
b) Não

9- Enumere quantos casos por cada uma das apresentações clínicas apontadas você realizou ressecção pulmonar nos últimos 12 meses:
a) Hemoptise
b) Infecção de repetição
c) Tuberculose resistente (o intuito primário foi controlar a infecção, inclui M-DR ou X-DR)
d) Como adjuvante no tratamento de micobactéria não tuberculosa
e) Controle de sintomas gerais como tosse e expectoração (com impacto na qualidade de vida)
* Resp. possíveis: 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - mais que 10

10- Quanto a etiologia, enumere quantos casos por cada uma das etiologias apontadas você realizou ressecção pulmonar nos últimos 12 meses:
a) Sequela de tuberculose (inclui bronquiectasia por tuberculose com e sem arpergiloma)
b) Tuberculose ativa (inclui M-DR ou X-DR)
c) Micobactéia não tuberculosa
d) Bronquiectasia não fibrose cística e não pós tuberculose
e) Outras
* Resp. possíveis: 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - mais que 10

https://dx.doi.org/10.21037/jtd-23-111

11- Quantos casos operados tinham associado aspergiloma ou aspergilose cavitária crônica?
0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - mais que 10

12- Quais dos recursos tecnológicos abaixo você dispõe e faz uso regular durante ressecções pulmonares para doença pulmonar infecciosa, no serviço em que realiza a maior parte desses casos:
(Seleção múltipla de respostas)
a) Videotoracoscopia
b) Robótica
c) Dispositivo de sutura mecânica (grampeador) para tratamento de coto brônquico
d) Broncoscopia em sala operatória
e) Coagulação por plasma de argônio

13- No que diz respeito ao tratamento de cavidades residuais consideradas volumosas após ressecções pulmonares complexas por doença infecciosa (lobectomias, bilobectomias ou lobectomia com segmentectomia associada). Ainda no intraoperatório da ressecção, você realiza alguma das medidas abaixo:
(Seleção múltipla de respostas)
a) Preencimento da cavidade com retalho muscular.
b) Toracoplastia seletiva
c) Bloqueio de nervo frênico
d) Secção de nervo frênico
e) Pneumoperitônio
f) Apenas drenagem torácica e aguardo evolução.

14- Seu serviço realiza tratamento cirúrgico e/ou endoscópico para pacientes com lesões pulmonares cavitárias que não possuem condições de ressecção pulmonar e/ou possuem doença pulmonar extensa?
a) Colapsoterpia endoscópica
b) Toracoplastia e mioplastia
c) Cavernostomia
d) Outros
e) Todos anteriores

15- Aproximadamente quantos casos de empiema pós-ressecção pulmonar você recebeu nos últimos 12 meses? Considere apenas as ressecções realizadas no serviço em que opera a maior parte desses casos.
* Resp. possíveis: 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - mais que 10

16- Quantos desses casos tinham fístula de coto associada?
* Resp. possíveis: 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - mais que 10

17- Seu serviço dispõe e faz uso de procedimentos endoscópicos para tratamento de fístula de coto brônquico pós ressecção?
a) Sim, dispõe e faço uso.
b) Sim, dispõe mas não faço uso.
c) Não dispõe por isso não uso.
d) Não dispõe, mas se houvesse não usaria.

https://dx.doi.org/10.21037/jtd-23-111

18- Levando em conta as orientações estabelecidas pela OMS no consenso de 2014 sobre o papel da cirurgia no tratamento da tuberculose pulmonar (The role of surgery in the treatment of pulmonary TB and multidrug- and extensively drug-resistant TB - World Health Organization 2014), você se considera satisfeito com o tratamento oferecido pelo seu serviço aos pacientes com tuberculose pulmonar?
   a) Não conheço o consenso em questão.
   b) Conheço o consenso, porém não o utilizo como parâmetro na minha assistência.
   c) Me sinto satisfeito
   d) Me sinto insatisfeito

- Para a resposta de não realizar ressecções por doença infecciosa:
   3) Quais os motivos que melhor explicam você não realizar ressecções pulmonares por doença infecciosa em seu serviço?
   a) Não é o foco da minha instituição
   b) Pneumologia não encaminha
   c) Infectologia não encaminha
   d) Recebo os casos, mas me falta infraestrutura para tratá-los.

English version: Survey – Lung resection in infectious diseases

Survey:

1- Most lung resections (anatomical segmentectomy, lobectomy, pneumonectomy) due to infectious disease that you perform are in institutions:
   A) Public assistance.
   B) Academic public.
   C) Private assistance.
   D) Private academic.
   E) I do not perform pulmonary resections due to infectious disease.

2- What was the approximate number of pulmonary resections (anatomical segmentectomies, lobectomies, pneumonectomies) due to infectious disease that you performed in the last 12 months?
   Answer: numerical

3- List according to order of importance (number of cases referred), the origin of the patients with infectious lung disease that you see for evaluation of surgical treatment:
   (Possibility of answers from 1 to 6 for each item, not allowing duplicate answers)
   a) Pulmonology
   b) Infectology
   c) medical clinic
   d) Basic health unit (no specialty specified)
   e) Spontaneous demand from the patient without prior medical evaluation
   f) Other

4- Is the service where you perform most of your resections for infectious lung disease considered a reference center for this treatment in your region)?
   a) yes
   b) no

https://dx.doi.org/10.21037/jtd-23-111

5- Which of the structural resources below do you have and use regularly to care for patients with infectious lung disease:
(Multiple selection of answers)
a) Respiratory isolation bed in the ward
b) Respiratory isolation bed in the ICU
c) Specific operating room for bacilliferous patients
d) Respiratory endoscopy center
e) Specific clinic for treating pulmonary infectious diseases
f) Back-up service for prolonged hospitalization of patients
g) Outpatient nutrition service
h) Outpatient physiotherapy service

6- Which of the following resources do you have and use regularly during the planning, preparation and recovery of patients with infectious lung disease:
(Multiple selection of answers)
a) Regular multidisciplinary meeting aimed exclusively at discussing cases of infectious lung disease.
b) Perioperative nutritional optimization protocols
c) ERAS protocols
d) Postoperative motor and respiratory physiotherapy
e) Group for care with stoma and surgical wounds
f) Chronic and/or acute postoperative pain treatment group

7- In the preoperative evaluation of major lung resections (lobectomies and pneumonectomy) due to infectious disease, you must perform (in a protocol manner) which of the following exams:
(Multiple selection of answers)
a) Pulmonary function test (spirometry)
b) Measurement of lung diffusing capacity for carbon monoxide (DLCO)
c) Ergospirometry
d) Transthoracic echocardiogram
e) 6-minute walk test
f) Assessment of cardiovascular risk
g) I do not carry out any mandatory preoperative examination

8- Does your service have (or have easy access to) and routinely perform first- and second-line drug (STD) sensitivity testing or WHO-endorsed rapid molecular tests (eg, geneXpert) for patients with tuberculosis?
a) yes
b) no

9- List how many cases for each of the clinical presentations indicated you underwent lung resection in the last 12 months:
a) Hemoptysis
b) Recurrent infection
c) Resistant tuberculosis (primary intent was to control infection, includes M-DR or X-DR)
d) As an adjuvant in the treatment of nontuberculous mycobacteria
e) Control of general symptoms such as cough and expectoration (with an impact on quality of life)
* Answer possible: 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - more than 10

https://dx.doi.org/10.21037/jtd-23-111

10- Regarding the etiology, list how many cases for each of the etiologies indicated you underwent lung resection in the last 12 months:
a) Sequelae of tuberculosis (includes bronchiectasis due to tuberculosis with and without arpergilloma)
b) Active tuberculosis (includes M-DR or X-DR)
c) Nontuberculous mycobacteria
d) Non-cystic fibrosis and non-post tuberculosis bronchiectasis
and others
* Answer possible: 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - more than 10

11- How many operated cases had associated aspergilloma or chronic cavitary aspergillosis?
0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - more than 10

12- Which of the following technological resources do you have and use regularly during lung resections for infectious lung disease, in the service where most of these cases are performed:
(Multiple selection of answers)
a) Videothoracoscopy
b) Robotics
c) Mechanical suture device (stapler) for treatment of bronchial stump
d) Bronchoscopy in the operating room
e) Argon plasma coagulation

13- With regard to the treatment of residual cavities considered voluminous after complex pulmonary resections due to infectious disease (lobectomy, bilobectomy or lobectomy with associated segmentectomy). Still in the intraoperative period of the resection, you perform some of the measures below:
(Multiple selection of answers)
a) Filling of the cavity with muscle flap.
b) Selective thoracoplasty
c) Phrenic nerve block
d) Phrenic nerve section
i) Pneumoperitoneum
f) Only thoracic drainage and waiting for evolution.

14- Does your service perform surgical and/or endoscopic treatment for patients with cavitary lung lesions who do not have lung resection conditions and/or have extensive lung disease?
a) Endoscopic collapse therapy
b) Thoracoplasty and myoplasty
c) Cavernostomy
d) Other
e) All previous

15- Approximately how many cases of empyema after pulmonary resection have you received in the last 12 months? Consider only the resections performed in the service where most of these cases operate.
* Answer possible: 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - more than 10

16- How many of these cases had a fistula associated with the stump?
* Answer possible: 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - more than 10

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17- Does your service have and use endoscopic procedures for the treatment of bronchial stump fistula after resection?
   a) Yes, it is available and I use it.
   b) Yes, it is available but I do not use it.
   c) It doesn't have it so I don't use it.
   d) Does not have it, but if it did, I would not use it.

18- Taking into account the guidelines established by the WHO in the 2014 consensus on the role of surgery in the treatment of pulmonary tuberculosis (The role of surgery in the treatment of pulmonary TB and multidrug- and extensively drug-resistant TB - World Health Organization 2014) , do you consider yourself satisfied with the treatment offered by your service to patients with pulmonary tuberculosis?
   a) I do not know the consensus in question.
   b) I know the consensus, but I do not use it as a parameter in my assistance.
   c) I feel satisfied
   d) I feel dissatisfied

• For the response of not performing resections due to infectious disease:
   3) What are the reasons that best explain why you do not perform lung resections due to infectious disease in your service?
   a) It is not the focus of my institution
   b) Pulmonology does not refer
   c) Infectology does not refer
   d) I receive the cases, but I lack the infrastructure to treat them.

https://dx.doi.org/10.21037/jtd-23-111