SUPPLEMENT

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THORACIC SURGERY

HOME-BASED PREOPERATIVE EXERCISE TRAINING FOR LUNG CANCER PATIENTS UNDERGOING SURGERY: A FEASIBILITY TRIAL

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INTRODUCTION

Preoperative exercise training is strongly recommended to improve postoperative outcomes after lung cancer surgery. However, patients' accessibility to preoperative exercise programs is still sub-optimal, mainly due to inaccessibility to facility-based interventions, with patients indicating a strong preference to exercise in a home-based environment.

AIMS

The main purpose of this study was to investigate whether a preoperative home-based exercise program (HBEP) is feasible in lung cancer patients awaiting surgical resection.

METHOD

This was a prospective, two-center feasibility trial, including patients awaiting resection for suspected or confirmed lung cancer (clinical stage I-IIIa). The HBEP consisted of aerobic plus resistance exercise, with weekly telephone supervision. Feasibility was determined by rates of recruitment, retention, exercise adherence and acceptability (scale 0-5, 5 = highest acceptability). Secondary outcomes included safety (Common Terminology Criteria for Adverse Events) and preliminary effects on health-related quality of life (European Organization for Research and Treatment of Cancer Quality of Life Questionnaire C30 [QLQ-C30]) and physical performance (incremental shuttle walk test, five times sit to stand and handgrip strength), assessed at three timepoints: baseline (T0), after the HBEP (T1), 4-5 weeks postoperatively (T2). Preliminary effects were analyzed using repeated measures analysis of variance (ANOVA) or Friedman nonparametric test.

RESULTS AND CONCLUSION

Over three months, 15 patients were eligible and all consented to enroll in the study (recruitment rate of 100%). A total of 14 patients (93%) completed the HBEP and 12 patients were assessed after surgery (lobectomy, n=11), corresponding to a retention rate of 80%. The median duration of the HBEP was three weeks. Median adherence exceeded the planned training volume for aerobic (104%) and resistance exercise (111%). Patients perceived the HBEP as highly acceptable, with a median average score of 4.9. A total of nine non-serious adverse events were reported (Grade 1, n=8; Grade 2, n=1), predominantly arthralgias. After the HBEP, there were significant improvements in the QLQ-C30 summary score and five-times sit to stand ($p<0.05$). Postoperatively, there were no significant changes in QLQ-C30 scales and physical performance ($p>0.05$). This study revealed that a HBEP combining aerobic and resistance exercise is feasible, well accepted and safe in lung cancer patients awaiting surgical resection. In addition, results also suggest exercise-induced benefits in health-related quality of life and functional strength. Future randomized controlled trials are needed to determine the efficacy of this intervention to optimize postoperative outcomes.

REAL-WORLD TREATMENT PATHWAYS IN STAGE III NON-SMALL CELL LUNG CANCER IN PORTUGAL (PICTURE): ANALYSIS OF SURGICAL PATIENTS

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Keywords: *Non-Small Cell Lung Cancer, Real world evidence, Treatment pathways*

INTRODUCTION

Non-Small Cell Lung Cancer (NSCLC) is responsible for approximately 80-90% of all lung cancers, and is often diagnosed at an advanced stage with poor prognosis. About one third of NSCLC patients are diagnosed with stage III disease – a very complex and highly heterogeneous condition yet poorly characterized.

AIMS

We aimed to portray stage III NSCLC in Portugal, focusing patients undergoing surgery.

METHOD

In PICTuRE 278 patients were included of which 21,3% (n=59) underwent surgery. Surgical patients' mean age was 65±9, mostly men (57,6%), 79,3% current/former smokers, 71,2% had adenocarcinoma histology, 79,7% stage IIIA and 20,3% stage IIIB, all with ECOG 0-1. All patients were submitted to non-invasive staging (at least one method), while only 64,4% were submitted to minimally invasive/invasive staging methods (i.e. EBUS/mediastinoscopy). Median lag times between MDT and treatment initiation are represented in Figure1. Neoadjuvant treatment was performed in 22 patients, mostly stage IIIA (72,7%). Pathologic response to neoadjuvant treatment was poorly reported (pathologic complete response was observed in 8.3%). Most common surgery modality was lobectomy (76,3%). Resection margins were reported for 50 patients (with 84% R0 and 16% R1/R2) and unknown for 9 cases. Operative mortality and morbidity were 3.4% and 20.3%, respectively. Adjuvant treatment was performed in 87,7% patients (n=50: chemotherapy38.0%; radiotherapy 12% and hemoradiotherapy 50%), mostly stage IIIA (80.9%). Survival analysis are depicted in Table 1.

RESULTS AND CONCLUSION

PICTuRe reveals NSCLC-Stage III complexity: staging is yet not consensual (a relevant proportion of patients were not staged with minimally invasive/invasive methods); outcomes in surgical patients can be further improved (no statistical significance were observed between most groups). As so, future guidelines should be designed, considering the implementation of efficient multidisciplinary teams targeting optimal median times for diagnosis, staging and treatment initiation in Portugal.

JUST A TOOTHACHE? - DESCENDING NECROTIZING MEDIASTINITIS: A 5-YEAR SINGLE-CENTRE EXPERIENCE

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Keywords: *descending necrotizing mediastinitis, surgical drainage, thoracic surgery*

INTRODUCTION

Descending necrotizing mediastinitis (DNM) is a life-threatening inflammatory process of the mediastinum closely linked with downward spread of head and neck infections, with a mortality rate up to 20%. It constitutes a surgical emergency requiring early diagnosis and effective multidisciplinary therapeutic strategy.

AIMS

The aim of this study is to analyze the clinical characteristics and multimodal approach employed in managing this condition.

METHOD

We retrospectively analyzed all patients with DNM who underwent transthoracic surgical drainage in our institution between 2017 and 2021. DNM was diagnosed based on the criteria proposed by Estrera et al. We applied the Endo et al pathological classification, modified by ESTS.

10 patients were eligible over a 5-year period. Mean age was 44,1 (±12,9) years, with male predominance (80,0%). The most prevalent underlying cause observed was oral infection (70,0%), specifically odontogenic infection (40,0%) and peritonsillar abscesses (30,0%). 30,0% presented with cervico-pharyngeal infections, particularly epiglottic abscess (10,0%) and retropharyngeal collections (20,0%). The diffuse form of DNM was identified in all patients. 10,0% of patients were type IIB whereas 90,0% were classified as type III due to pleural involvement.

All patients underwent combined transcervical and transthoracic drainage, with cervicotomy and VATS in 1 patient and cervicotomy and thoracotomy being used in the remaining 9 patients. 3 patients required bilateral thoracotomy. In 5 patients, an additional transoral approach or submandibular incision was employed to aid in abscess drainage. In 1 patient, infection extended to the pericardium and required the creation of a pericardial window. A total of 31 surgical drainage procedures were accounted for in conjunction with Thoracic Surgery, Maxillofacial Surgery and Otorhinolaryngology. All patients were reoperated, with a minimum of 2 surgeries and maximum of 7 procedures in 1 patient.

The mean mediastinal drainage duration and mean hospital stay was 24,1 (±14,8) days and 43,5 (±22,0), respectively. The mean length of intensive care unit stay was 27,6 (±18,9) days. 9 patients (90,0%) received mechanical ventilation for a mean duration of 24,8 (±15,3) days and a tracheostomy was placed in 3 of these patients. The main isolated bacteria was Streptococcus constellatus. Nevertheless, DNM is mainly a polymicrobial infection and requires a long course of broad-spectrum antibiotics. No deaths occurred in-hospital. Today, all patients remain asymptomatic without evidence of complications.

RESULTS AND CONCLUSION

DNM is a serious condition generating difficult and lengthy hospital stays. The extent of DNM determines the surgical treatment but an early multidisciplinary approach promotes positive outcomes.

LONG TIME NO SEE

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Keywords: *Open window thoracostomy, Bronchopleural fistula, Empyema*

INTRODUCTION

One of the biggest challenges in thoracic surgery is the management of empyema after pulmonary resections (1). It is frequently associated with a bronchopleural fistula (BPF) and it can be a complication of any kind of pulmonary resection but is more frequent post pneumonectomy (2). Open window thoracostomy (OWT) is an old but effective method for drainage of the pleural cavity in these patients (3, 4). Empyema after lung resection could be a life-threatening condition but fortunately, it is a rare complication so OWT has become less familiar for the younger thoracic surgeons.

AIMS

Our goal is to discuss this rare surgical option through a difficult clinical example.

METHOD

We recently had a case of a 63 years old male patient that underwent a pleural decortication and a left lower lobectomy by thoracotomy due to a fibrothorax in Cape Verde He was transferred to our hospital because of postoperative emphyema. The chest drain had purulent drainage and a pleural leak was visible. The diagnosis of tuberculosis was performed by bronchoalveolar lavage and the flexible bronchoscopy was not clear about the presence of BPF.

An OWT was performed and the BPF was identified. Wet dressings with an antiseptic were placed and changed every 24 hours initially. This treatment allowed elimination of local infection and BPF control. After 1 month a pedicled muscle flap (latissimus dorsi muscular flap) was transposed to cover the BPF. The same protocol with the wet dressings was performed. After 2 months the patient underwent plasty of the lateral thoracic wall defect with a pledicled myocutaneous flap (pectoralis major myocutaneous flap). The patient was discharged within one month after the last surgery with good function and aesthetic results.

RESULTS AND CONCLUSION

OWT followed by a muscle transposition represents an effective although rare therapeutic option and the existence of this surgical technique should be known by every thoracic surgeon.

THE BATTLE CAMP OF HEMOPTYSIS

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Keywords: *Hemoptysis, Bronchopulmonary arterial fistula*

INTRODUCTION

Hemoptysis is defined as expectoration of blood from the alveoli or airways of the lower respiratory tract. There are many causes of hemoptysis and frequently the origin of the bleeding is not immediately detected.

AIMS

Our goal is to discuss through a difficult clinical case the various etiologies of hemoptysis.

METHOD

We recently had a case of a 50 year old female patient, non-smoker, who developed cough with hemoptysis. The patient was diagnosed with pneumonia and discharged home with antibiotherapy. A week later she went to the emergency department due to 3 episodes of hemoptysis in 4 hours (lost of ±300ml). The patient denied other symptoms like weight loss or fever. She also denied exposure to tuberculosis. The admission labs showed normocytic normochromic anemia and the inflammatory markers were decreasing. She did a computed tomography (CT) of the chest that showed an ovoid structure measuring 13 x 7 mm in the anterior segment of the upper lobe of the right lung, with a vascular enhancement pattern, apparently dependent on the anterior segmental branching of the right pulmonary artery. There were also some small cavitations as well as perihilar and right paratracheal adenopathies. The CT after 24h showed a higher oval area of vascular "blush" (16 x 9 mm) which most likely corresponded to a pseudoaneurysm. We tried twice to perform an angiography but it was not possible to select the anterior branch of the right superior lobar artery. At the 4th day of hospitalization the patient had only one episode of large hemoptysis and limited desaturation (88%). At the 7th day of hospitalization the CT showed similar findings with an area of vascular "blush" and the patient underwent a right upper lobectomy. Postoperative course was uneventful and she did not have more episodes of hemoptysis. The histology showed a pulmonary lobe with a cavitation with a bronchopulmonary arterial fistula with a recent thrombus and surrounding bronchiectasis and signs of bronchiolitis obliterans organizing pneumonia.

RESULTS AND CONCLUSION

A bronchopulmonary arterial fistula is an extremely rare diagnosis and a rare cause of hemoptysis. The majority of the cases described in the literature are acquired, often after chronic inflammation or infection like tuberculosis or pneumonia. Bronchiolitis obliterans organizing pneumonia is a rare diffuse interstitial lung disease arising from injury to the alveolar wall that mimics community-acquired pneumonia. Our patient had hemoptysis as a consequence of two rare diseases. Despite being rare these conditions must be kept in mind.

NEOADJUVÂNCIA REVOLUCIONADA: EXPERIÊNCIA REAL DA COMBINAÇÃO DE QUIMIOTERAPIA E IMUNOTERAPIA

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Keywords: *neoadjuvancia, cancro pulmão, quimioterapia e imunoterapia*

INTRODUCTION

Os autores apresentam um caso clínico real de utilização da combinação de quimioterapia e imunoterapia (QT+IO) em neoadjuvância. A utilização desta combinação neste setting inovador, fora do contexto de ensaio clínico é, provavelmente dos primeiros casos a ser descrito no nosso país.

METHOD

Homem, 64 anos, autónomo, fumador (CT 50 UMA). Com história médica conhecida de cataratas, glaucoma e acidente viação aos 19 anos com colocação de prótese metálica vertebral. Medicado habitualmente com brimonidina, Bimatoprost e timolol. Em Janeiro 2022 após quadro clínico de infeção respiratória com expetoração hemoptoica inicia investigação adicional com TC tórax com massa do lobo superior esquerdo para-mediastínica anterior (79 x 48 mm), relacionando-se intimamente com a artéria mamária interna esquerda e sem plano de clivagem com o mediastino, sem adenopatias mediastínicas com critérios dimensionais valorizáveis e com dúvida na supra-renal (SR) esquerda. A PET/TC estadiamento excluiu metastização assim como envolvimento ganglionar, havendo apenas captação da massa com SUV max 11,2 (cT4N0M0 – estádio IIIA). A TC-CE excluiu lesões ocupando espaço do SNC. O diagnóstico histológico foi obtido por punção aspirativa transtoracica, tratando-se de um adenocarcinoma do pulmão (TTF1+) com Pd-L1 <1%; NGS sem mutações driver. Clinicamente o doente apresentava ECOG PS0 e estudo funcional respiratório com diminuição da difusão (DLCO 71%; DLCO/VA 61%). Em RMD decidiu-se realizar QT+IO neoadjuvante (cisplatina, pemetrexed e nivolumab) tendo em vista cirurgia curativa. Durante os tratamentos teve como intercorrência, infeção COVID19, mas sem sequelas respiratórias. Doente tolerou a QT+IO sem efeitos adversos significativos, e a TC de avaliação intercalar apresentou resposta parcial (massa 68x39mm). A cirurgia decorreu 5 semanas após último ciclo de QT+IO tendo realizado lobectomia superior esquerda e esvaziamento ganglionar (gg 5, 7, 9, 11) – resseção R0. A histologia da peça operatória confirmou tratar-se de ADC, com leito tumoral 55mm, margens cirúrgicas sem tumor, tumor residual viável em apenas 10% e o restante com necrose e inflamação, sem invasão linfovascular, pleural ou ganglionar – ypT1aN0 – IA1.

RESULTS AND CONCLUSION

Os resultados recentemente apresentados da utilização da QT+IO em neoadjuvância (Checkmate 816), tem deixado a comunidade médica que se dedica ao cancro do pulmão particularmente esperançada neste conjunto de doentes por vezes limítrofes para cirurgia ad initium. A utilização desta combinação na vida real, apresentou um excelente resultado.

PECTUS UP, A NEW APPROACH TO TREAT PECTUS EXCAVATUM – INITIAL EXPERIENCE OF OUR CENTER

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Keywords: *Pectus Excavatum, Surgical Correction, Pectus Up*

INTRODUCTION

Pectus Excavatum (PE) is the most common congenital chest wall deformity and consists in a depression of the anterior chest wall. Ravitch and Nuss procedures are the two most common operations among surgical options. We report a new minimally invasive method to correct PE – Pectus Up Technique. This technique offers some advantages versus the traditional approaches. It uses a subpectoral device that is positioned outside the thoracic cavity, avoiding the risk of affecting the internal organs, and allows for CPR. The material of the implant plate is bioinert, however, before implantation, patients must use a bracelet with the material for a week to test for allergies. A good finish result is obtained.

AIMS

We aim to present our initial experience with the Pectus Up technique.

METHOD

Three patients underwent surgery, without intercurrences. Mean duration of surgery was 65 minutes. All patients were females, with a median age of 22 (range 17-35). Haller index range was 3,5-4,1. Median length of stay was 2 days, and pain control was achieved on post-operative day 1 without need of opioids. No complications were reported as well as no 30-days mortality. All 3 patients reported they were happy with the aesthetic result.

RESULTS AND CONCLUSION

In conclusion, this new technique aims to treat the defect by means of an extra-thoracic surgical approach, reducing the risk of the procedure, pain, and recovery time, whilst obtaining an equivalent good correction result. More cases need to be performed to better ascertain these conclusions.

MASSIVE HEMOPTYSES - A CASE REPORT

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Keywords: *Hemoptysis, Lung Resection, Arterial Embolization*

INTRODUCTION

Massive hemoptysis is a life-threatening condition associated with a high mortality rate without adequate treatment. Currently, first-line therapy is bronchial artery embolization (BAE), however, when this fails, patients might require surgical lung resection.

AIMS

We report a case of a 62-year-old male that presented to the emergency with hemoptysis, denying previous episodes and with no relevant medical history.

METHOD

A bronchoscopy showed no evidence of active bleeding, and the patient was discharged to continue assessment in ambulatory. A week later he returned with a new episode of hemoptysis after coughing. A new episode of hemoptysis motivated the intubation of the patient and a bronchoscopy was performed. Abundant bleeding was noticed, with complete occlusion of the main right bronchus and partially occlusion of left main bronchus. Some clots were removed to permeate the bronchial tree and a double lumen endotracheal tube was placed. A chest x-ray showed a complete white lung on the right side. The patient was proposed for rigid bronchoscopy and pulmonary angiography, so a transfer for a central hospital was organized. Ventilation was not efficient and there was recurrent endobronchial bleeding, so venous-venous ECMO was placed as a bridge therapy. A right BAE was performed with success, with no signs of active bleeding at the end of the procedure. Rigid bronchoscopy was performed to permeate the bronchial tree, however, with removal of clots on the right, the bleeding restarted and was not successfully controlled. Angiography reveled an active bleeding of the inferior ramification of the right bronchial artery besides the previous coils. Another attempt for embolization was tried without success. The chest x-ray showed a bilateral white chest. A multidisciplinary team assessed the case, and it was decided to perform a right lower lobectomy in an emergency setting. The procedure was performed through a posterolateral thoracotomy, with no complications. Simultaneously to the surgery, a bronchoscopy was performed to clean the bronchial tree. After the procedures, a complete recover of the left lung occurred, with complete lung expansion. The right lung remained atelectatic at first, but with daily bronchoscopy and optimization of ventilation it recovered. The patient remained on ECMO for 12 days after surgery, being successfully decannulated.

RESULTS AND CONCLUSION

Massive hemoptysis is usually treated with BAE, nevertheless, when the procedure is unsuccessful, patients might require surgical lung resection. It is important to recognize these patients and to have an experienced multidisciplinary team to best access these cases, allowing for fast action.

FIRST RIB FRACTURES IN CHILDREN: WHAT TO KNOW

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Keywords: *rib fractures, first rib, paediatric*

INTRODUCTION

First rib fractures are uncommon, mainly in paediatric population, considering its anatomic features and their skeleton plasticity. It may be the result of trauma, violent muscular avulsion, or fatigue, but traditional teaching dictates that fracture of the first rib is a hallmark of severe trauma. However, more and more reports of isolate first rib fractures have been published regularly regarding young athletes.

AIMS

Herein, to unfold awareness to an unnoticed diagnosis, we describe two paediatric cases of isolated first rib fracture in adolescents without a clear identifiable cause nor an underlining trauma mechanism.

METHOD

Case 1 is a 16-year-old male presented to the Emergency Department (ED) following a 50cm fall of his bed that morning exacerbating a 2-week pain in his left shoulder. He also reported a bullying incident at school where the left arm was strongfully pulled. A plain chest of thorax and left shoulder was obtained, demonstrating an isolated first rib fracture (Fig1). Case 2 is a a 15-year-old boy male who presented to the ED due to a vague left shoulder pain for the last month, without any trauma or noticeable cause. On plain film, an isolated left first rib fracture was noticeable (Fig2). Both patients were discharged on analgesics and rest over a period of three weeks and recovered uneventfully.

RESULTS AND CONCLUSION

Isolated fractures of the first rib are uncommon, and patients will generally present with nonspecific symptoms of the shoulder girdle. It can radiate to the neck or deltoid and can also acquire a pleuritic nature. It can easy be clinically misleading raising concern about shoulder pathology. Neurovascular injuries should always be investigated, as fracture of the first rib with ensuing callus formation is a rare but fearing cause of thoracic outlet. First rib fracture is normally visualised with chest radiographs and radiographs of the thoracic ribs as a simple linear crack.

We highlight the scarcity of reports on isolated first rib fractures outside of sports medicine, as well as the importance of considering this otherwise easily missed diagnosis in a common complaint in children. Nevertheless, it will hardly ever need extensive work-up and conservative management will be enough until a a pain-free return to normal life.

HYBRID OPERATING ROOM INTRAOPERATIVE CT-GUIDED LOCALIZATION OF PULMONARY NODULES: COIMBRA THORACIC GROUP EXPERIENCE

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Keywords: *Hybrid operating room; Intraoperative computed-tomography-guided location; Lung nodules*

INTRODUCTION

A hybrid operating room (HOR) is a high-technology space, which integrates CT scan in the operation room. It is capable of providing real-time imaging, facilitating simultaneous percutaneous metallic marker placement and resection procedure of small pulmonary nodules (<1 cm) and ground glass opacities (GGOs), in the same room, with a one-stop concept, thus avoiding the potential complication associated with traditional workflow performed in radiology suite.

AIMS

We report our initial experience with simultaneous single-stage localization and removal of nonpalpable undiagnosed pulmonary nodules.

METHOD

Retrospective analyses of all patients who underwent image-guided surgery workflow in our institution's HOR, from September 2019 to September 2022. Data collected included demographics, imagological features, surgical aspects, pathology and outcomes.

All patients were intubated with a double-lumen tube and placed in lateral decubitus under general anesthesia. CT scan was performed for nodule localization and targeting with metallic marker in cooperation with a radiologist. Immediate lung resection was then performed by our team.

A total of 10 patients (3 males and 7 females) underwent 11 image-guided lung resections. The lesion size ranged from 4mm – 39mm (mean: 15mm); 4 lesions were GGOs, 2 subsolid, 4 small pulmonary nodules (<1 cm) and 1 deep pulmonary nodule. Lesion localization was performed with coil in the first 3 cases and the remaining with hookwire. Seven lung resections were performed by video-assisted thoracoscopic surgery (VATS), 2 required conversion to thoracotomy and 2 thoracotomies were initially performed for technical reasons. In 3 patients with intraoperative diagnosis of lung cancer, a lobectomy was performed (3 VATS). A total of 4 lobectomies and 7 wedge resections was achieved. Results of pathological examination revealed 6 primary lung cancers, 3 osteosarcoma lung metastases and 2 with no evidence of malignant cells. Median postoperative length of stay was 5 days (range: 2-11 days). The 3 patients with coil placement show retained metallic material in postoperative imaging studies with no evidence of lung nodules recurrence at 6-month follow-up CT scan. No major complications were observed.

RESULTS AND CONCLUSION

Hybrid theatre offers a safe and effective tool centralizing simultaneous location and resection of non-palpable nodules enhancing diagnostic yield with low procedural complications.

To our knowledge we are the first Portuguese Thoracic group that has introduced this innovative surgical approach into their clinical practice. Efforts have been tailored to increase intraoperative marker-guide VATS procedures in our institution, due to its potential for significantly shortening the time from diagnosis to curative treatment of non-palpable nodules.

THE ROLE OF CERVICAL MEDIASTINOSCOPY: A SINGLE CENTER EXPERIENCE OVER A DECADE

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Keywords: *Mediastinoscopy; effectiveness; safety*

INTRODUCTION

Mediastinoscopy has long been a crucial tool in the diagnosis and staging of primary lung cancer and in the investigation of patients with mediastinal lymphadenopathy or diseases localized in the mediastinum. Currently, with the advancement of imagological and endosonographic minimal invasive diagnostic techniques, the role of mediastinoscopy has evolved.

AIMS

The purpose of this study was to evaluate the effectiveness and safety of mediastinoscopy in a large university hospital that routinely performs this procedure.

METHOD

We performed a retrospective cohort study of all patients who underwent mediastinoscopy for diagnosis or staging purposes, between January 2012 and June 2022, at our institution. Demographics, histopathological results and postoperative morbidity and mortality parameters were analyzed.

A total of 533 consecutive patients underwent cervical mediastinoscopy - average age was 57 (± 15.23) years, and 66,8% (n= 356) were male. 131 patients (24,6%) were staged for known or suspected lung cancer. Pathological N2/N3 involvement was proven in 55 patients (10,3%), 3 of them with previous negative endobronchial ultrasound-guided (EBUS) biopsies. Histopathological results included sarcoidosis (n= 180 [33,8%]), lymphoma (n=40 [7,5%]), tuberculosus lymphadenitis (n=31 [5,6%]), reactive lymph nodes (n= 11 [2,1%]) and metastatic carcinoma (n=10 [1,9%]). Nineteen of 49 patients (38,7%) previously submitted to EBUS had a positive mediastinoscopy. Clavien-Dindo classification IIIa-b mild complications were recorded in 0.93% (n=5) with no intraoperative mortality. Thirty-day mortality was 1,3% (n=7). There was no difference in morbidity and mortality in the group undergoing re-mediastinoscopy (p=0,059; p=0,899). Average hospital stay was 1,1 (± 0,72) days, with 93,9% discharged on day 1 postoperative.

RESULTS AND CONCLUSION

Our study showed that mediastinoscopy is an efficient modality, which allows pathological diagnosis with acceptable morbidity and mortality. Nowadays, the preferred use of endoscopy-based techniques (EBUS/ EUS) as a first choice for lymph node sampling may led to the decline presented in the mediastinoscopy numbers over the years, even it is done in a different institution. Fewer mediastinoscopies may jeopardize the quality of training programs and safety rates. Further studies comparing both diagnostic techniques should be made to provide the optimal role of mediastinoscopy in the armamentarium of invasive tests, facilitating the decision on test choice and sequence factoring in local resources and expertise.

PRIMARY SPONTANEOUS PNEUMOTHORAX: COMPARISON BETWEEN ACUTE AND ELECTIVE SETTING

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Keywords: *pneumothorax, acute, elective, surgery*

INTRODUCTION

Recurrent or persistent primary spontaneous pneumothorax (PSP) are historically formal indications for surgery. To the best of our knowledge, there are no published studies addressing the differences between these patients, regarding postoperative drainage time (PDT), length of stay (LOS), postoperative complications and late recurrence.

AIMS

This study aims to compare PDT and LOS of patients submitted to surgery in persistent PSP (group A) versus patients with elective surgery for recurrent PSP (group B). Secondarily, we tried to compare the postoperative complications and late recurrence rate.

This is a retrospective study conducted in our center between January 2017 and August 2022. We identified 100 patients with PSP who were submitted to talc poudrage with wedge resection by videoassisted thoracoscopic surgery (VATS) and divided in two groups:

· Group A: persistent pneumothorax

· Group B: treated in elective context without active pneumothorax.

METHOD

Group A consisted of 71 patients. Mean drainage time before surgery was 7,65±4,14 days. Mean PDT=2,99 ± 1,36 days and mean LOS=4,17± 2,83 days. There were 7 complications registered (9,85%): 3 (4,22%) prolonged air leaks (>5 days); 1 (1,41%) postoperative pneumonia and 3 (4,22%) recurrent pneumothoraxes after drain removal. There were 2 late recurrences, 1.5 and 2 months postoperative, both treated with VATS talc proudage.

Group B consisted of 29 patients. Mean PDT was 3,24±3,01 days, and mean time of post operative LOS was 4,31±3,30 days. There were 4 complications registered (13,79%): 2 (6,89%) prolonged air leaks (>5 days) and 2 (6,89%) pneumothorax recurrence after drain removal. No late recurrences were observed.

No mortality was registered was registered in both groups.

Overall recurrence rate was 2%.

There was no statistical difference between the two groups, P value was 0,472 and 0.889 for PDT and LOS, respectively.

RESULTS AND CONCLUSION

In our study, treatment in an acute or elective context didn't have an impact on the PDT or in the LOS.

The statistical analysis regarding recurrence rate and postoperative complications was hindered by the low number of results, however, the rates observed are consistent to the ones described in the literature.

A prospective study is recommended for the comparison of results between surgery for PSP in an elective vs acute context.

LUNG ANATOMIC SEGMENTECTOMY

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Keywords: *Lung segmentectomy;*

INTRODUCTION

We present a case of a 68 years old male, former smoker of 80 pack years, in follow up for a right upper lobe GGO with progressive growth since 2017.

The CT scan in 2021 showed an increase of the lesion, measuring 20x17mm, located in the S1-S3 segments transition, and no other suspicious findings. The case was discussed in a multidisciplinary meeting and it was decided to proceed to surgical treatment. Cardiopulmonary risk stratification showed low risk for postoperative complications.

Exact lesion localization (S1+S3) and branching profile of segmental arteries, veins and bronchi is confirmed with the radiologist from axial, coronal and sagittal CT scan views.

Patient was submitted to video-assisted thoracoscopic SI-SIII right bi-segmentectomy, according to the following steps: lesion localization with CT guided coil previous to surgery; Branching pattern and size of B1,B2 and B3 were confirmed using bronchoscopy after tracheal intubation; patient placed in left lateral decubitus; 30mm mini-thoracotomy in the 4th intercostal space middle axillary line and 12mm port in the 7th intercostal space anterior axillary line; the hilum of the upper lobe was exposed from the ventral side; dissection of the central vein and identification and ligation of V1 segmentary vein with mechanical suture; A1 and A3 segmentary arteries isolation and ligation with mechanical suture; V3b segmentary vein isolation from the central vein and ligation with mechanical suture; Lymph node (11R) dissection for bronchus exposure; B1 and B3 segmentary bronchi isolation and encircling; right upper lobe segmentary bronchi identification by illumination from a bronchoscope; B1 e B3 ligation with mechanical suture; section of the fissure between middle and upper lobe with mechanical suture; creation of an inflation-deflation line for intersegmental plane identification; intersegmental plane section with mechanical suture; specimen retrieval; right lung ventilation.

Postoperative pneumonia with negative cultures, treated with broad spectrum antibiotics. Discharged at the 12th postoperative day. Pathology report: in situ non-mucinous ADC, 16mm long axis - pTispN0M0.

Patient is asymptomatic at 18 months follow up with no new suspicious lesions on CT scan.

Lung segmentectomy has been widely discussed in the scientific community. Recent results from the JCOG 0802 phase III randomized trial, showed superiority of segmentectomy to lobectomy in patients with small sized (tumor diameter <2; consolidation-to-tumor ratio >0,5) peripheral NSCLC in terms of OS and lung function preservation and no significant difference in the overall RFS, recommending segmentectomy as the standard surgical procedure in this subset of patients.

THYMECTOMY IN MYASTHENIA GRAVIS PATIENTS– THE EXPERIENCE OF A TERTIARY CENTER

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Keywords: *myastenia gravis, thymectomy, thymoma*

INTRODUCTION

Thymectomy remains a mainstay of treatment in Thymomatous and Nonthymomatous Myasthenia Gravis (MG), with improved clinical outcomes and reduced need for medical treatment, however, there is little research regarding long-term follow-up.

AIMS

Assess the impact of surgery on the long-term outcome of patients with MG at our center.

METHOD

Retrospective analyses of MG patients submitted to thymectomy between 2010 and 2017 at the thoracic surgery department of CHUC. Clinical assessment was performed according to the MG Foundation of America (MGFA) Clinical Classification (cMGFA). The follow-up was categorized according to the MGFA Post-Intervention Status (MGFA-PIS). We defined "Good Outcome" as categories Complete Stable Remission (CSR), Pharmacological Remission (PR), Minimal Manifestations (MM) and Improved (I) and "Bad Outcome" as categories Unchanged (U), Worse (w), Exacerbation (E) or Death of MG (D), followed by a subgroup analysis. Statistical analysis was performed with SPSS.

Thirty-three patients underwent extended thymectomy and 66.7% were female. Median age of diagnosis was 44±19.4 years. Most patients (84.4%) had anti-acetylcholine receptor antibodies and 81.8% had generalized forms of MG. The majority of patients (66.7%) had surgery less than 12 months after the clinical diagnosis. Thymomatous MG was present in 17 (51.5%) patients. Compared to Non-Thymomatous MG, these patients were older (55±17.6 vs 37.7±18.5 years) and most were men (52.9% versus 12.5%). Overall, we obtained a good outcome in most patients in the first (81.8%), second (84.4%), and fifth (82.8%) year of follow-up. There was a shift towards better prognosis categories in the good outcome group: 6.9% CSR, 3.4% PR, and 65.5% MM in the fifth year. Only 1 patient died from myasthenic crisis triggered by bilateral pneumonia, 5 years after surgery. Thymomatous MG patients presented in more advanced status on preoperative cMGFA ($p=0.041$) and on postoperative cMGFA assessment at years 1 ($p=0.042$), 2 ($p=0.024$), and 5 ($p=0.046$), despite no statistical difference in the MGFA-PIS assessment. Lower preoperative cMGFA correlated with good outcomes at years 1, 2, and 5 ($p<0.001$). Preoperative medical treatment did not influence the long-term follow-up outcome. A shorter time to surgery (<12 months) correlated with better outcomes at year 5 ($p=0.008$).

RESULTS AND CONCLUSION

Thymectomy led to a sustained clinical improvement in our cohort, allowing for a reduced need for medication. This benefit increased in the second and fifth years of follow-up. Preoperative clinical status and shorter time to surgery seem to have a positive influence on long-term prognosis. We expect that an extended follow-up would improve our results.

IS THE VISCERAL PLEURAL INVASION A FACTOR OF WORSE PROGNOSIS FOR SEGMENECTECTOMY 6 PATIENTS? – 8-YEAR EXPERIENCE IN A SINGLE CENTER

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Keywords: *segmentectomy 6, visceral pleural invasion, segmentectomy, sublocar ressection*

INTRODUCTION

Limiting the surgical excision for the treatment of peripheral small nodules in patients with an adequate cardiovascular and respiratory reserve is under a heated discussion recently. Can segmentectomy be an adequate treatment in these cases? Is the visceral pleural invasion (VPI) a factor of elevated risk of recurrence and should the surgeon perform a lobectomy instead of segmentectomy?

AIMS

We try to answer if the segmentectomy 6 is an adequate treatment for the peripheral small nodules with VPI.

METHOD

Our analysis is a one-center retrospective study based on the 8-year experience of our department. The inclusion criteria of 38 patients were: primary tumor, segmentectomy 6 with limphadectomy, malignant histology and the surgery being performed an/2015-Aug/2022. We analyzed the histopathology, the nodule size, the presence of N1/N2 disease and the follow up time.

The statistical analysis involved measures of descriptive statistics and inferential statistics. The level of significance for rejecting the null hypothesis was set at (α) $\leq$ .05. The test used was Fisher, the chi-square test of independence and Student's t test for independent samples.

RESULTS AND CONCLUSION

Data refers to a total of 38 patients - mostly male (71.1%). The mean age was 67.9years (29-85) and the mean follow-up time 32months (1-88). All of the patients had an appropriate respiratory evaluation pre-surgery. Out of 38 patients 1 didn't have mediastinal nodules assessment.

20 patients had a VPI, out of which 16 were recurrence free (80%) at the end of the follow-up period and out of 18 patients without VPI 15 (83.3%) were relapse free. The mean size of the nodules was 2(1.0-4.5 cm).

In the group of 7 patients that recurred 57% had nodules smaller than 2cm (in recurrence free group this percentage was 64%), 6 out of 7 (87%) had a local relapse, 28.6% had a surgical margin less than 1mm, 14.2% had N2 disease, 14.2% didn't have the mediastinal nodal assessment, 57% had VPI and histopathologic evaluation was adenocarcinomas in 85.7%.

6 of the patients have lesions suspected of possible recurrence but are still in the diagnostics process.

The relationship between VPI, according to Fisher's test, p =.745, ganglion status $\chi 2$ (2) = 2,399, p = .583, maximum size, t(36) = -0.518, p = .608, was estimated not statistically significant.

Based on our center´s experience, segmentectomy 6 seems to be equally effective for lesions both with or without the VPI in a long-term follow-up, offering all benefits of less invasive, lung sparring surgery.

ROBOTIC-ASSISTED LOBECTOMY: A STEP BY STEP VIDEO DEMONSTRATION

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Keywords: *Lung cancer, Lung Lobectomy, Robotic-assisted thoracic surgery*

INTRODUCTION

Lung cancer is the leading cause of cancer-related deaths worldwide. The treatment paradigm of lung cancer has evolved, and minimally invasive surgery is the accepted gold-standard today. Robotic-assisted thoracoscopic surgery (RATS) is a minimal invasive technique with established advantages concerning conventional open surgery and may provide less postoperative pain, shorter hospital stays and lower morbidity for lung cancer patients. RATS lobectomy can also improve surgical accuracy, allowing for better dissection plans and hemorrhage control.

AIMS

Our center has recently started a RATS program. We report the case of a RATS right upper lobectomy, one of the first made in a portuguese public hospital.

METHOD

We present the case of a 51 year-old female with no previous known diseases or smoking habits. Two subsolid pulmonary lesions located in the right upper lobe were incidentally identified on a CT scan, measuring 14 and 6 mm, respectively. The patient remained asymptomatic and physical examination showed no abnormalities. PET-CT scan revealed a low metabolic uptake of both nodules and no distant metastasis. For mediastinal staging an endobronchial ultrasound (EBUS) was performed but no nodal biopsies were made due to their reduced dimensions. Pulmonary function tests confirmed normal respiratory capacity, namely FEV1 of 109% and DLCO of 86%. Final clinical staging was T1c vs T3, N0M0 (stage Ia vs IIb). The patient underwent a robotic-assisted right upper lobectomy and lymphadenectomy. The surgery took a total of 2 hours and 15 minutes and elapsed without complications and minimal blood loss (50mL). Pleural drainage was removed on the first postoperative day and the patient was discharged 2 days after the operation. Pathology examination revealed complete resection of two lung adenocarcinomas of 10 and 23 mm in size, with similar acinar-predominant histological patterns, with a final staging classification of pT3N0R0. One month after the surgery, the patient is asymptomatic with no evidence of complications. This clinical case will be discussed in a multidisciplinary meeting for a decision regarding adjuvant therapy.

RESULTS AND CONCLUSION

RATS lobectomy is being established as a safe and reliable treatment choice and may allow for the reduction of intraoperative complications and blood loss, improvement of technical precision, and shorter drainage times and hospitalizations.

PULMONARY ASPERGILLOMA: 10+ YEARS' EXPERIENCE WITH SURGICAL TREATMENT

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Keywords: *Aspergillus; Pulmonary Aspergillosis/surgery*

INTRODUCTION

Aspergilloma consists of a cavity or bronchiectatic airway filled with hyphae, cellular debris, mucus, fibrin, and blood, with important clinical implications. Aspergillomas are firmly associated with personal history of pulmonary tuberculosis, due to the residual cavities within which Aspergillus grows. Given the historical relatively high incidence of tuberculosis in Portugal, the analysis of our experience with aspergilloma and its surgical management becomes quite relevant. Surgical resection is well established as the effective long-term treatment, however associated with a high rate of peri and postoperative complications.

AIMS

Characterization of the population of patients with a diagnosis of pulmonary aspergilloma and their surgical management in a tertiarycenter over 10+ years, and evaluation of post-operative complications and prognostic factors.

METHOD

Retrospective analysis of 21 patients with a diagnosis of pulmonary aspergilloma who underwent surgery in a tertiary center from January 2011 to June 2022.

The study included 21 patients (13 men; 8 women) with a mean age of 55.6 + 14.1 years. Of them, 29% were smokers or ex-smokers, and 47,6% had a previous history of tuberculosis. The most common presentation was hemoptysis (66,6%). Most patients had a complex aspergilloma (76,2%) and 23,8% a simple aspergilloma. Lobectomy was the most frequent surgical procedure and was performed in 47,6% of patients (bilobectomy in 30% of them), and all procedures were open surgery. No thoracoscopic approach were performed. Postoperative complications occurred in 28,6% of patients, and the most frequent was pneumothorax with persistent air leak (19% of patients). There were no perioperative deaths. The mean follow-up time was 56,3 months (1 - 135) and the 5 years mortality rate of 38,1%. Of them, 3 patients died because of non-related causes.

RESULTS AND CONCLUSION

The most common surgical procedure performed was open surgery lobectomy. The postoperative complications rate was similar to previous studies.

Although a potentially deleterious procedure, surgical treatment for both simple and complex aspergilloma could achieve satisfactory long-term outcomes in selected groups of patients.

ARTERIOPLASTIC PROCEDURES FOR LUNG CANCER TREATMENT: A 5 YEAR SINGLE CENTER EXPERIENCE

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Keywords: *Arterioplasty, Lung cancer treatment, Lobectomy*

INTRODUCTION

Anatomical lung resection with arterioplastic procedures for lung cancer treatment is a surgical option in patients with centrally located neoplasms with pulmonary artery involvement, having the advantage of preserving lung parenchyma while trying to achieve safe oncological margins. A simple arterioplasty can be enough if a small portion of the artery is involved. However, reconstruction is sometimes necessary when there is a greater involvement of the vessel.

AIMS

The main goal of this study was to analyze the outcomes of patients submitted to arterioplastic procedures for lung cancer treatment in our center.

METHOD

During the study period, 11 arterioplastic procedures for lung cancer treatment were performed. 7 patients were male, 4 were female, with a mean age of 64,8 years (34-81). Neoadjuvant chemotherapy was used in 4 cases. Most patients were submitted to left upper lobectomy (n=9), 1 patient to left lower lobectomy and 1 to an upper bilobectomy. The main approach was thoracotomy (n=8), there were also 2 VATS converted to thoracotomy and 1 Clamshell. Simple arterioplasty was used in 3 patients, patch arterioplasty (bovine pericardium) was used in 8 patients. In 5 patients bronchoplastic techniques were also performed. Most patients presented squamous cell lung cancer (n=5), 4 of them had lung adenocarcinoma, 1 presented a large cell carcinoma and 1 had a pulmonary artery sarcoma. Most of the preoperative stages were IIb (n=4), the other ones being Ia3 (n=1), IIa (n=2) and IIIa (n=3). 2 patients had R1 resection (microscopical tumor at the bronchial stump). Only 2 patients had major complications: a pulmonary valve endocarditis which needed large spectrum antibiotics and an acute embolic right upper limb ischemia that was submitted to endovascular thrombectomy. There was no mortality in the perioperative period. The mean post op chest tube duration was 11,72 (3-25) days and the mean length of stay was 12,6 (4-26) days. 8 patients were submitted to adjuvant therapy (QT n=4, QRT n=2, RT n=2). There was disease progression in 4 patients (2 of them were distant recurrences) with a mean time to progression of 11,2 months.

RESULTS AND CONCLUSION

In conclusion, arterioplastic procedures for lung cancer treatment are surgically challenging, nevertheless they can be performed safely, with no perioperative mortality. Surgery in these patients must be decided in multidisciplinary teams and be performed in dedicated high-volume centers in order to obtain better results. The limitations of this study are related to its retrospective nature as well as a limited sample size.

VATS LEFT UPPER LOBECTOMY WITH BRONCHOPLASTY

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Keywords: *VATS, Lobectomy, Bronchoplasty*

INTRODUCTION

Bronchoplastic techniques in association with anatomical lung resection are therapeutical options in lung cancer surgical treatment. Although technically demanding, this kind of procedure allows sparing of lung parenchyma while achieving a complete oncological resection (with negative margins). Performing bronchoplastic techniques through VATS can be even more challenging.

AIMS

We present the video of a VATS left upper lobectomy with bronchoplasty and mediastinal lymph node dissection

METHOD

During the study period, 11 arterioplastic procedures for lunWe report the case of a 63 year old man, current smoker (60 pack year) with known chronic lower left limb ischemia, and colic polyposis. Due to hemoptysis, he started etiological investigation. CT scan showed a left upper lobe atelectasis caused by a left upper bronchus lesion. A bronchoscopy with biopsies was performed and revealed a necrotic polypoid endobronchial lesion located at the left upper bronchus. Pathology showed a squamous cell carcinoma, negative for PD-L1. A PET-CT and head-CT scan showed no evidence of distant disease. EBUS was negative for nodal disease. The patient had a 94% FEV1 and 75% DLCO / 82% DLCO-VA at lung function test. Final clinical staging was T2aN0M0 (IB). After multidisciplinary discussion, the patient was proposed for surgery. A VATS left upper lobectomy with bronchoplasty and mediastinal lymph node dissection was performed. During surgery, bronchial margin was sent for frozen section which showed no evidence of disease. The bronchial stump was closed with 4/0 PDS running suture.

During the postoperative period the patient developed atrial fibrillation. The chest tube was removed after 4 days and the patient was discharged at the 6th postoperative day. Patology examination showed a squamous cell carcinoma pT2aN1, R0 resection was confirmed. Post operative pain was easily controlled with oral medication. After multidisciplinary discussion, the patient was submitted to adjuvant chemotherapy and is currently alive with no signs of progression at 3rd postop month.

RESULTS AND CONCLUSION

Bronchoplastic techniques are surgically challenging and should be performed in high-volume centers in order to obtain good results and guarantee its replicability.