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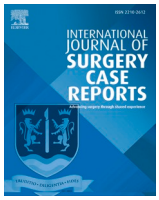

Case report

Hybrid transthoracic oesophagectomy due to carcinoma with complications after COVID-19 pneumonia – A case report

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ABSTRACT

Introduction and importance: This case report describes postoperative complications in a patient after hybrid oesophagectomy for oesophageal carcinoma after COVID pneumonia. The global COVID-19 pandemic affected cancer patients indicated for surgery. Covid 19 may worsen the results of oesophageal cancer surgery. More similar studies are needed.

Case presentation: A 69-year-old male was diagnosed with squamous cell carcinoma of the middle oesophagus based on PET/CT without disease generalisation. His stenotic tumour required a nutritive jejunostomy, with subsequent neoadjuvant radiochemotherapy indicated according to the CROSS protocol. The patient developed COVID pneumonia during the cancer therapy. After managing the COVID pneumonia, oncological therapy was completed and a hybrid oesophagectomy was performed 8 weeks later. Serious complications (respiratory failure, septic shock, anastomosis dehiscence) developed during the postoperative period. All complications were managed therapeutically. The patient was type IVb according to the Clavien-Dindo classification.

Clinical discussion: Postoperative complications may develop in any patient operated for oesophageal carcinoma, especially if high-risk predictive factors are present. The question arises as to how much the post-COVID condition affected the onset of these serious complications.

Conclusion: Post-COVID patients are at a risk of developing post-COVID syndrome, which may lead to a wide range of symptoms in the affected organs. Further studies on the relationship between COVID-19 and oesophagectomy for oesophageal carcinoma will be necessary to clarify the relationship between the complications during the postoperative period in patients with oesophageal malignancy.

1. Introduction

The global COVID-19 pandemic has had and, to this day, continues to have an impact on the treatment of malignancies. Patients with malignancies due to COVID-19 are at a risk of delay in the necessary surgical therapy, with the associated hazard of progression of the malignancy or serious post-COVID surgical treatment complications [1]. This case report describes a patient with oesophageal cancer who underwent hybrid thoracoscopic oesophagectomy after COVID pneumonia in a teaching hospital where approximately 25 oesophagectomies are performed per year. Serious postoperative complications occurred during the postoperative period. Only a few cases of patients who underwent esophagectomy for oesophageal cancer and had associated covid-19 complications have been reported in the literature so far. This paper has been reported in line with the SCARE 2020 criteria [2].

2. Case report

A 69-year-old male had a two-month history of dysphagia with a weight loss of 7 kg. The history included intermittent alcohol consumption and smoking of about 10 cigarettes daily. The patient was 170 cm tall, weighed 60 kg, his BMI was 20.50. He had a history of cervical and lumbar spine surgery, no internal comorbidities, no permanent medication. There were no allergies. Endoscopy revealed a stenotic

Abbreviations: X-ray, X-ray examination; PET, Positron Emission Tomography; CT, Computed Tomography; ECCG, Esophagectomy Complications Concensus Group – ECCG; SUV, standardized uptake values; EUS, Endosonography; ATB, Antibiotics; CROSS, ChemoRadiotherapy for Oesophageal cancer followed by Surgery Study PR - partial response.

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impenetrable oesophageal tumour located 26 cm from the incisors. PET/CT detected a 41 mm long oesophageal tumour (SUV 29.9) without pathological alteration of the lymph nodes and with no distant metastases detected (Fig. 1). EUS was not performed due to the endoscopically impermeable tumour. The histology diagnosis was squamous cell carcinoma. The patient was classified as cT3cN0cM0 in the clinical staging. The multidisciplinary cancer board indicated the patient for neoadjuvant radiochemotherapy. Before its initiation, a nutritive jejunostomy was established due to the stenotic tumour. A standard preventive PCR test for SARS-CoV-2 RNA (COVID19), as normally used during the worldwide COVID-19 pandemic, was performed prior to the cancer treatment. The test result was negative.

Neoadjuvant radiochemotherapy was indicated in the CROSS protocol (carboplatin/paclitaxel), the radiochemotherapy was administered in fractional increments of 1.8 Gy at a total dose of 41.4 Gy. The patient's contact with a COVID-positive patient required a follow-up PCR test to detect SARS-CoV-2 RNA (COVID19), which was positive. The course of COVID in the patient was mild, the patient was hospitalised at a COVID ward, where he required oxygen therapy and symptomatic treatment. X-ray and CT scan of the lungs confirmed COVID pneumonia (Fig. 2). The cancer treatment was completed after managing the COVID pneumonia. A follow-up PET/CT was performed to evaluate the effect of the cancer treatment: a significant regression of the malignancy was found, the maximum SUV was 3.4 (Fig. 3). The condition was evaluated as a partial response (PR) to the cancer treatment according to the RECIST classification [3].

The patient underwent hybrid McKeown oesophagectomy 8 weeks after the end of the cancer treatment and 14 weeks after the COVID pneumonia. The surgery was performed by an experienced surgeon with a twenty years of experience performing oesophagectomies. The thoracic oesophagus was mobilised via the right-side thoracoscopic approach and mediastinal lymphadenectomy was performed. The oesophagectomy was completed from the cervical approach and upper middle laparotomy. Reconstruction of the upper part of the digestive tract was performed via gastroplasty. The surgery included pyloroplasty. The anastomosis in the deep cervical space was reconstructed semi-mechanically – the posterior wall using an end-to-side linear stapler and the anterior wall with a continuing suture. The patient spent the postoperative period in the ICU; with no oral intake, with nasogastric tube and complete parenteral therapy. Extubation was performed 21 h after the end of the surgery.

On postoperative day 5, the patient experienced atrial fibrillation with a rapid ventricular response, which was managed with medication (beta-blocker + amiodarone i.v.). On postoperative day 6, a CT scan was performed due to a febrile peak of 40.2 °C and CRP elevation to 288.1 mg/l, leukocytosis 11.9 10^9/l, confirming dehiscence of the cervical anastomosis and left-side fluidothorax. The dehiscence was treated surgically (revision, toilet, drainage); fluidothorax was managed via chest drainage. On the postoperative day 10, an endoscopic examination was performed to clarify the vitality of the transponate, detecting a vital gastroplasty. A partial ischaemia of the transponate with necrotic mucosa in the range of about 3–5 cm was described in the area of anastomosis dehiscence. There was another febrile peak (39.3 °C) on the postoperative day 11, CRP 139.2 mg/l, leukocytes 13.1 10^9/l; a CT scan revealed an empyema cavity of the right hemithorax. Its guided drainage was performed under CT visualisation (Fig. 4). The patient experienced a respiratory failure on the postoperative day 19; artificial ventilation was required, with catecholamine support of circulation. The patient was ventilated for 7 days. In total, the patient was hospitalised in the ICU for 31 days during the postoperative period. Microbiological agents (*Streptococcus anginosus*, Staphylococcus species, *Prevotella intermedia*, *Staphylococcus haemolyticus*, *Solobacterium moorei*, *Enterobacter cloacae*, *Enterococcus faecalis*, *Candida krusei*) were found in the dehiscent anastomosis, empyema of the right hemithorax, sputum and blood culture during the hospitalization in the ICU. Targeted ATB therapy was initiated based on the results of microbiological cultures (Tazobactam + Piperacillin 4,5 g i.v., Gentamicin 240 mg i.v., Metronidazole 500 mg i.v., Fluconazole 200 mg i.v., Vancomycin 1 g i.v., Meropenem 1 g i.v., Tigecycline 50 mg i.v., Ciprofloxacin 400 mg i.v.). The patient received a total of 3 blood transfusions during the postoperative period; nutrition was provided both parenterally and via enteral nutritive jejunostomy. The dehiscence of the cervical anastomosis gradually healed, as confirmed by a negative finding in a follow-up swallowing imaging examination. The patient transitioned to full oral nutrition and was discharged on day 56 after the start of hospitalization.

Histology detected squamous cell carcinoma (ypT2ypN0 according to the TNM classification), Mandard tumour regression grade 2. 14 lymph nodes without metastases were described in the resection.

An outpatient examination two months after discharge was favourable; he felt well, without any significant difficulties swallowing, nutritive jejunostomy was discontinued; the patient's performance status was 2.

3. Discussion

The only curative surgical therapy in oesophageal carcinoma, with the exception of stage T1a, is oesophagectomy. Surgically, it is a difficult resection and reconstruction procedure, with a relatively high morbidity (above 50%) in the postoperative period; mortality ranges between 3% and 9% [4]. An article entitled “International consensus on standardization of data collection for complications associated with esophagectomy” was published by Donald Low and the international Esophagectomy Complications Concensus Group (ECCG) in the Annals of Surgery in 2015 in order to unify the standardization of complications occurring after oesophagectomy. [5].

The global COVID-19 pandemic has also affected patients with malignancies. Patients after COVID-19 are at the risk of developing the post-COVID syndrome, which may lead to long-term impairment of the

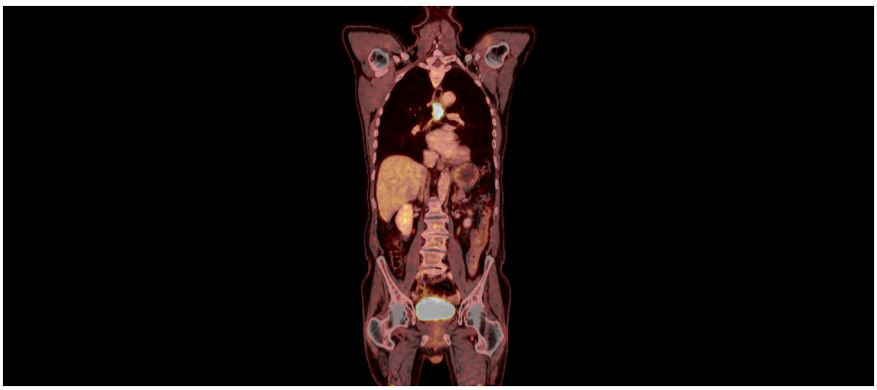

Fig. 1. PET/CT - carcinoma of the middle oesophagus.

Fig. 2. X-ray scan of the lungs – COVID pneumonia bilaterally.

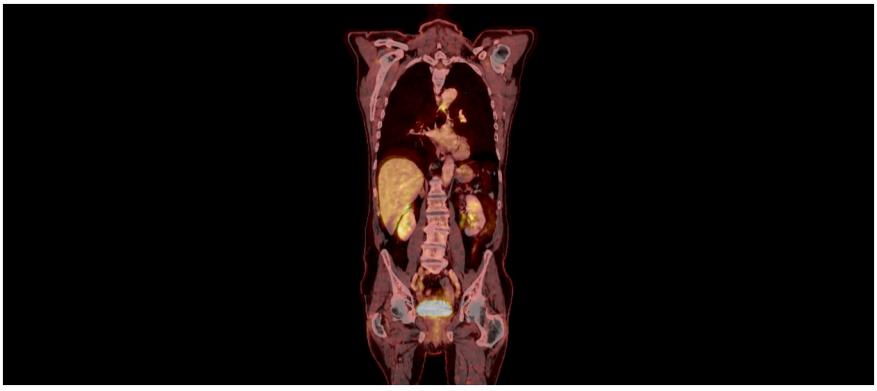

Fig. 3. PET/CT - check-up examination after neoadjuvant therapy; partial response to cancer treatment.

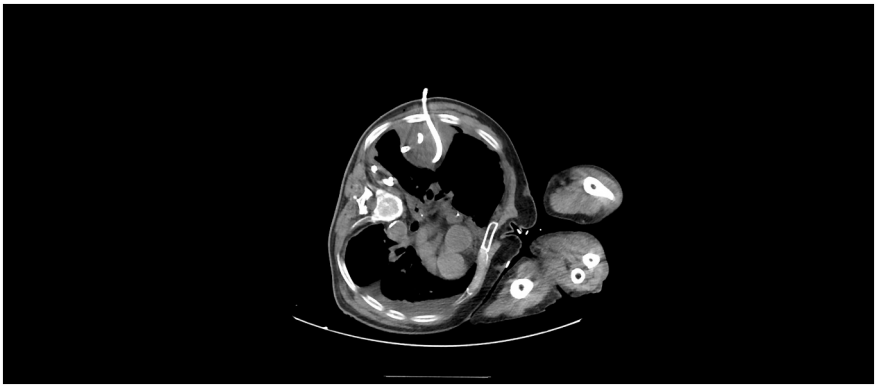

Fig. 4. CT - empyema cavity of the right lung – CT-guided drainage.

lungs, heart, kidneys and/or other organs [6]. Very little data are currently available on patients with oesophageal cancer after COVID pneumonia. A total of 5 publications were found in the Pubmed database in 8/2021 by a keyword-based search (esophagectomy, Covid-19, complications).

The patient who is described in this case report was indicated for nutritive jejunostomy and subsequent neoadjuvant cancer treatment due to the advanced stenotic oesophageal tumour. COVID-19 was detected in the patient during cancer treatment, with pulmonary involvement confirmed via lung CT scan. The disease was mild and no artificial lung ventilation was required. The cancer treatment was completed after managing the COVID pneumonia; the control PET/CT scan showed signs of a partial response to the cancer treatment. The patient had no symptoms of the post-COVID syndrome, lung X-ray, PET/CT scans and spirometric examination were performed during the pre-operative examination, without a pathologic finding in any of them. The surgery was postponed due to the history of COVID pneumonia; the CROSS protocol requires surgical therapy 4–6 weeks after the end of the cancer treatment [7]. The patient experienced serious respiratory complications after the oesophagectomy in the postoperative period. According to the ECCG, as a complication after oesophagectomy requiring artificial lung ventilation and repeated intubation due to recurrent respiratory failure.

Pulmonary complications, especially respiratory failure and ARDS in the postoperative period, are among the most serious complications, with the highest mortality reported in patients requiring repeated intubation due to respiratory failure [4]. Individuals that are at an enhanced risk of pulmonary complications after oesophagectomy

include elderly patients, patients with chronic nicotine abuse, malnutrition, pulmonary dysfunction and immune disorders [8]. Other factors influencing the development of respiratory complications include the duration of the surgery and blood loss during the surgery, decreased FEV1 in spirometric examination, neoadjuvant cancer treatment and the development of a fistula in the anastomosis [9]. The most common postoperative cardiac complications in oesophagectomy include deep vein thrombosis, arrhythmia and myocardial infarction. General sepsis of patients with a high risk of septic shock is a very serious complication. Linden et al. reported the incidence of septic status at 4.6% in a group of 11,943 oesophagectomies, while the mortality in these patients was 24.9% [4].

The patient that is described in this case report suffered a severe septic condition requiring catecholamine support of circulation and targeted ATB therapy based on the results of microbiological cultures. Another severe complication was the dehiscence of the cervical anastomosis, which was managed by surgery and dehiscence site drainage. The ECCG classification of the complication was grade III. The dehiscence in the anastomosis may be classified into three grades: grade I does not require therapy change, only medication or dietary measures; grade II requires imaging or endoscopic therapy; grade III requires a surgery. The dehiscence was gradually cured despite being the highest-severity type. The follow-up swallowing examination after repeated surgical toilet described a healed anastomosis, without leakage of the contrast medium outside the lumen of the upper segment of the reconstructed digestive tract. Anastomotic dehiscence in the reference sets of surgery patients ranges from 2% to 14% [10]. In a meta-analysis evaluating the results of esophagogastric anastomosis using linear staplers versus a manual anastomosis, Deng et al. described a lower incidence of dehiscence and strictures in linear stapler anastomosis [11]. In this case report, the patient experienced serious complications (respiratory, septic, anastomotic) in the postoperative period. The patient was categorised as stage IVb in the Clavien-Dindo classification of surgical complications.

Postoperative complications may develop in any patients operated for oesophageal carcinoma, especially if predictive factors for their occurrence are present. The comorbidities that are most relevant for the oesophageal cancer surgery outcome are pulmonary and cardiac conditions.

Confirmed COVID in the postoperative period may contribute to the development of severe respiratory complications [12]. It is unclear to what extent the patient's past COVID pneumonia affected the postoperative complications. The COVID in the patient was mild and the surgery was performed 4 months after the end of the disease. Post-COVID patients are at a risk of developing the post-COVID syndrome, which may manifest itself through a wide range of symptoms in the affected organs. Another serious problem with COVID-19 is the wide range of virus genome mutations leading to different developments of the disease and different organs being affected. Additional studies of the relationship between COVID-19 and oesophagectomy for oesophageal carcinoma will be required to clarify the influences affecting the complications in the postoperative period in patients with oesophageal malignancy.

4. Conclusion

Esophagectomy is the surgical therapy of oesophageal cancer, and postoperative complications may develop in the postoperative period. The most serious are respiratory complications, which can directly endanger the lives of patients. Respiratory complications are also dominant in Covid-19, and post-covid syndrome with pulmonary involvement may develop after the disease has progressed. Covid-19 may affect the outcome of surgical therapy in patients with oesophageal cancer. Further studies on the relationship between covid-19 and esophagectomy for oesophageal cancer are needed to clarify the relationship between postoperative complications in patients with oesophageal malignancies.

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Ethical approval

Not required in our institution to publish Anonymous case reports.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Research registration

Not applicable.

Guarantor

Ass. Prof. Radek Vrba, MD, Ph.D.
Petr Špička, MD, Ph.D.

CRediT authorship contribution statement

Ass. Prof. Radek Vrba, MD, Ph.D. – design of the study, collection on the data, final approval of the version to be submitted

Lucie Lubušká, MD, Ph.D. – revising the manuscript, collection on the data, approval of the version to be submitted

Petr Špička, MD, Ph.D. – corresponding author, guarantor, revising the manuscript, final approval of the version to be submitted.

Declaration of competing interest

The author declared no conflict of interest.

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