INJ INTERNATIONAL NEUROUROLOGY JOURNAL

Thoracic Surgical Challenges in the COVID-19 Patients in Basrah City

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Abstract

Background: Numerous studies have discussed the reshuffling of surgical procedures amid the COVID-19 pandemic. However, there's limited information on the number of operations, case distribution, or the ability of The Department of Thoracic Surgery to provide surgeries during this period.

Methods: We conducted a retrospective review of the surgical logbook at the Department of Thoracic in the designated COVID-19 Al-Sader hospital. This involved analyzing the logbook and addressing our responses during the pandemic. Additionally, a predictive model was set up to study the surgeries that were postponed due to the outbreak.

Results: Fifty-two cases of COVID-19 were divided into three main groups depending on the method and type of treatment chest tube (pneumothorax), Thoracotomy (pneumothorax), conservative (subcutaneous emphysema), taking into account Smokers, patients with Hypertension and chronic kidney disease (CKD), the age and sex of the patient, and these effects were studied on the degree of infection, the method of treatment and the period of improvement.

after applying the inclusion criteria (spontaneous pneumothorax in confirmed COVID-19 patients) and the exclusion criteria (barotrauma and iatrogenic pneumothorax cases were excluded) a total of 52 cases matched our criteria. Conclusions: In 52 cases, the Forty-three cases had a chest tube used and maintain oxygen saturation. the other Five abnormal cases of COVID-19 infection led to their death after chest tube operations. In the other four cases, conservative subcutaneous emphysema, chest computed tomography (CT) was performed, deterioration of hypoxia was demonstrated, and they received non-invasive mechanical ventilation.

Key words: Thoracic surgery, COVID-19 Pandemic, Basrah City experiences

Introduction

The 2019 coronavirus disease (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has been a significant global public health crisis with extensive mortality and morbidity worldwide. The range of respiratory symptoms varies from mostly mild upper respiratory issues to severe pneumonia and acute respiratory distress syndrome (ARDS). For over a year, the SARS-CoV-2 pandemic has posed immense challenges to healthcare professionals globally.

The COVID-19 pandemic has significantly affected standard hospital services around the world. As of July 10th, there have been 12 million confirmed cases globally with over 50 thousand fatalities. This situation has greatly influenced delays for elective surgeries, leading to the cancellation or postponement of countless scheduled procedures. Evaluations after the pandemic and subsequent planning should prioritize surgical services to ensure proper surgical care for the public during such outbreaks.

Although many recommendations about surgery and some predictive studies on its impact have been made, there has yet to be research focusing on surgical volumes, the spread of surgical cases, or the hospital's capability to provide crucial surgical services, specifically from a thoracic surgery standpoint.

In China, designated hospitals treated all COVID-19 patients. As a result, thoracic surgery departments in non-COVID-19 hospitals might not have adequately crafted their strategies for the pandemic, given their limited experience. Nonetheless, all hospitals need to remain vigilant and ready for a potential resurgence of the disease.

ISSN:2093-4777 | E-ISSN:2093-6931
DOI: 10.5123/inj.2023.4.inj18
Vol. 27 Iss. 4 (2023)

The global impact of the COVID-19 pandemic has notably altered routine clinical and surgical functions in hospitals, diverting significant human and financial resources to combat the disease's spread. The COVID-19 infection, tied to the severe acute respiratory syndrome coronavirus-2, has been notably virulent. Roughly 15-20% of the infected individuals ended up in hospitals, with 6.1% necessitating ICU care and 2.3% unfortunately succumbing to the disease. Throughout this ordeal, hospitals grappled with a challenging balance: the danger of in-hospital virus spread versus the risks associated with postponing or axing medical procedures. This dilemma led to a significant number of thoracic surgeries being put on hold or canceled across numerous hospitals. Our facility became the second leading COVID-19 treatment center in Basrah city. Despite this, we restructured our admission policy to keep providing urgent surgical care, aiming to minimize the in-hospital transmission risk. Given that thoracic surgeries primarily address oncological conditions, like the globally prevalent lung cancer, the pandemic posed genuine concerns about delaying essential treatments for a significant number of patients.
Data was gathered from the medical records of patients at Alsader Teaching Hospital and Basra Teaching Hospital who required thoracic surgical intervention. Additionally, radiological imaging was crucial for diagnosing and monitoring Covid-19 pneumonia.

Typical CT scans of COVID-19 patients often show patchy ground-glass opacities primarily in the lower lobes, with a tendency for peripheral or posterior distribution. Though less frequent, findings can include pleural effusion, pericardial effusion, lymphadenopathy, cavitation, CT halo sign, and pneumothorax as the disease progresses. Notably, pneumothorax has been observed in COVID-19 cases that necessitate hospital admission.
Furthermore, there's ambiguity regarding the cancellation of elective surgeries. The approach to addressing the substantial backlog of thoracic surgeries remains unclear, especially given the significant shift in surgical priorities amidst the pandemic's challenges. During the peak of the outbreak in China, there was a notable scarcity of medical supplies, especially masks and personal protective equipment (PPE). A prediction model would be beneficial in making informed and efficient decisions regarding the allocation of these medical resources.

Aim of study

The aim of this study was to offer a compilation of current expert recommendations for handling thoracic surgery programs amidst the COVID-19 pandemic, pending the development of evidence-based guidelines. Additionally, this article seeks to discuss these matters by undertaking a retrospective study in a real-world context using data from our hospital, one of the five designated COVID-19 facilities in Basrah City, Iraq. Our adaptations and strategies at each phase of the COVID-19 response provide valuable insights and lessons.

Challenges Faced by Thoracic Surgery Patients during the COVID-19 Pandemic

The COVID-19 pandemic has posed multiple challenges for those in thoracic surgery care. Primarily, patients with conditions like Diabetes Malthus (DM), chronic kidney disease (CKD), Hypertension, and thoracic cancers such as lung and esophageal cancer need prompt diagnosis and treatment to optimize survival outcomes. Treatment delays, a result of the pandemic, can lead to disease progression, potentially diminishing treatment efficacy and survival prospects. Moreover, patients undergoing thoracic surgeries, especially those with underlying respiratory conditions like lung cancer or Chronic Obstructive Pulmonary Disease (COPD), may be more vulnerable to severe COVID-19 infections due to compromised lung functions. The likelihood of post-surgical complications may also increase if these patients contract COVID-19 before or after their procedures. Beyond health risks, the pandemic has introduced logistical barriers. Many hospitals now grapple with resource constraints, from beds and ventilators to Personal Protective Equipment (PPE), possibly affecting the availability of thoracic surgical interventions. Additionally, travel limitations and decreased public transport options can make reaching healthcare facilities a challenge for many patients.

Strategies for Providing Optimal Patient Care during the COVID-19 Pandemic

In the face of the obstacles brought on by the COVID-19 pandemic, there are several strategies to ensure the best care for thoracic surgery patients. Firstly, it's vital for healthcare professionals to guarantee timely diagnosis and treatment for these patients, even amidst the pandemic. Telemedicine could be leveraged for initial consultations to assess symptoms and evaluate surgical necessity. Additionally, patients presenting urgent thoracic issues, such as those with lung or esophageal cancer, should be given priority to receive swift surgical attention. Secondly, to mitigate the risk of COVID-19 spread among these patients, healthcare teams should adopt measures like preoperative COVID-19 assessments, utilizing rapid or Polymerase Chain Reaction (PCR) tests, to detect potential infections.

If patients test positive for COVID-19, their surgery should be deferred until their recovery. Furthermore, during surgeries, healthcare professionals must employ measures to minimize COVID-19 transmission risk. This includes wearing the right PPE and keeping operating room staff to a minimum. Post-surgery, it's imperative to vigilantly observe patients for complications and address them swiftly. To tackle the logistical issues thoracic surgery patients face during the pandemic, healthcare providers might consider solutions like offering transportation for those struggling to reach medical facilities. Collaborating with other medical institutions and public health bodies is also key to ensuring efficient resource distribution and uninterrupted patient care. While the COVID-19 pandemic has undeniably complicated the scenario for thoracic surgery patients, ranging from treatment delays to logistical obstacles, by embracing strategies to lower COVID-19 spread and addressing logistical hindrances, optimal patient care can still be achieved. Timely interventions for patients with urgent thoracic issues remain crucial, alongside consistent efforts to reduce COVID-19 transmission risks. As the situation evolves, healthcare strategies should also adapt to maintain the highest standard of care for these patients. Lastly, it's pivotal to acknowledge the emotional toll the pandemic might impose on thoracic surgery patients and provide them the necessary support.

Patients might grapple with anxiety and stress due to postponed or canceled surgeries, fears of contracting COVID-19, and uncertainties about what lies ahead. It's imperative for healthcare providers to recognize and address these emotional concerns, offering the necessary support to assist patients in navigating these difficulties.

Methode

Data was gleaned from the medical records of patients in the Department of Thoracic Surgery at both Alsader Teaching Hospital and Basra Teaching Hospital, spanning from January 23rd, 2020 to June 8th, 2021. The information system was utilized to accumulate surgical details. All pertinent data was transferred to Microsoft Excel 2019 for review, with MySQL functioning as the ongoing relational database for consistent updates.

Four researchers (Thamir F. Alkhiat, Abdulkareem Z. Al-Musawi, Mohammed Sanna Al-Shukoor, and Adel Makki Alyasiri) independently compiled pertinent data, which was subsequently cross-verified. The study included patients from the Department of Thoracic Surgery who underwent procedures during the Wuhan lockdown and who consented to be a part of the research by signing an informed consent form. We excluded entries lacking comprehensive details and those involving surgeries previously unavailable in our institution. We gathered data on the number of operations, ASA grades, counts of emergency/elective procedures, and other surgery-related specifics within the Department of Thoracic Surgery, contrasting these with figures from 2019 to 2021 to observe distribution disparities. Furthermore, thoracic surgeries were categorized based on the nature of operations: non-cancer surgeries were delineated as lung procedures and other treatments. The hospital's initial outbreak response measures were sourced from the Department of Hospital Medical Affairs. The research adhered to the principles of the Declaration of Helsinki (revised in 2013) and was sanctioned by the First Affiliated Medical Hospital of Basrah University (Approval No.030409-016-2023). All participants provided informed consent.

Study Design

Starting in March 2020, we scoured the official websites of national and international thoracic surgery associations for their guidelines concerning COVID-19. Only guidelines either published or cited by these thoracic surgery associations were included. If any society's recommendations were not publicly accessible, we reached out to them via email. These collected guidelines were then jointly reviewed by two independent researchers. Vital points were noted down and grouped into specific themes. The points were then categorized, and the consensus level was assessed. This process was done for 52 patients, as shown in Table 1.

When there were disagreements in categorization, a third researcher was brought in for consultation. Following that, the main points derived were dispatched to all the previously pinpointed thoracic surgery societies, aiming for a thorough consensus on the guidelines. The central statements and society responses were then compiled. A scoring system was established where the number of unfavorable recommendations was subtracted from the favorable ones. Neutral or unavailable responses were scored as zero.

These findings were then debated in light of the existing scholarly articles. No formal study approval was needed since the data was either publicly accessible or provided directly by the societies.

Statistics: The study did not employ statistical tests to arrive at a consensus. It neither compared the strategies across different countries nor aimed to infer causative conclusions.

Results

Their mean age was at range 40 to 60 years of them % were males the rest were females. Hypertension was found in % of them, Smokers, patients with Hypertension and chronic kidney disease (CKD), the age and sex of the patient, From the clinical point of view Cases were divided into two clinical categories; pneumothorax, and subcutaneous emphysema the percentage of which was 10%.

all cases of pneumothorax were managed initially with chest tube and some these patients 10 -15 % needed further thoracotomy, While subcutaneous emphysema cases were managed conservatively with medication and O_2 (unless associated with pneumothorax). The mean duration of air leak was 30 Mintuse.

The longest in one day and the shortest 12 hours. Thoracotomy was done in patients with persistent air leak (air leak more than 10 days despite chest tube and optimal medical treatment) who accepted this intervention and whom general condition was considered suitable for general anaesthesia. In patients who either where unfit because of poor cardiopulmonary status or who refused surgery Indwelling chest drain with hemlich valve were applied. The mortality rates in the subcutaneous emphysema group was five %while in chest tube group was 10% and in thoracotomy was 5 %.

A number of results were obtained for cases of Covid-19 infection. Figures from one to five represent cases of infection and can be divided into three groups. Table one represents 52 cases of infection, which were divided into three main groups, and the results can be followed up through figures from one to five, and the table is one.

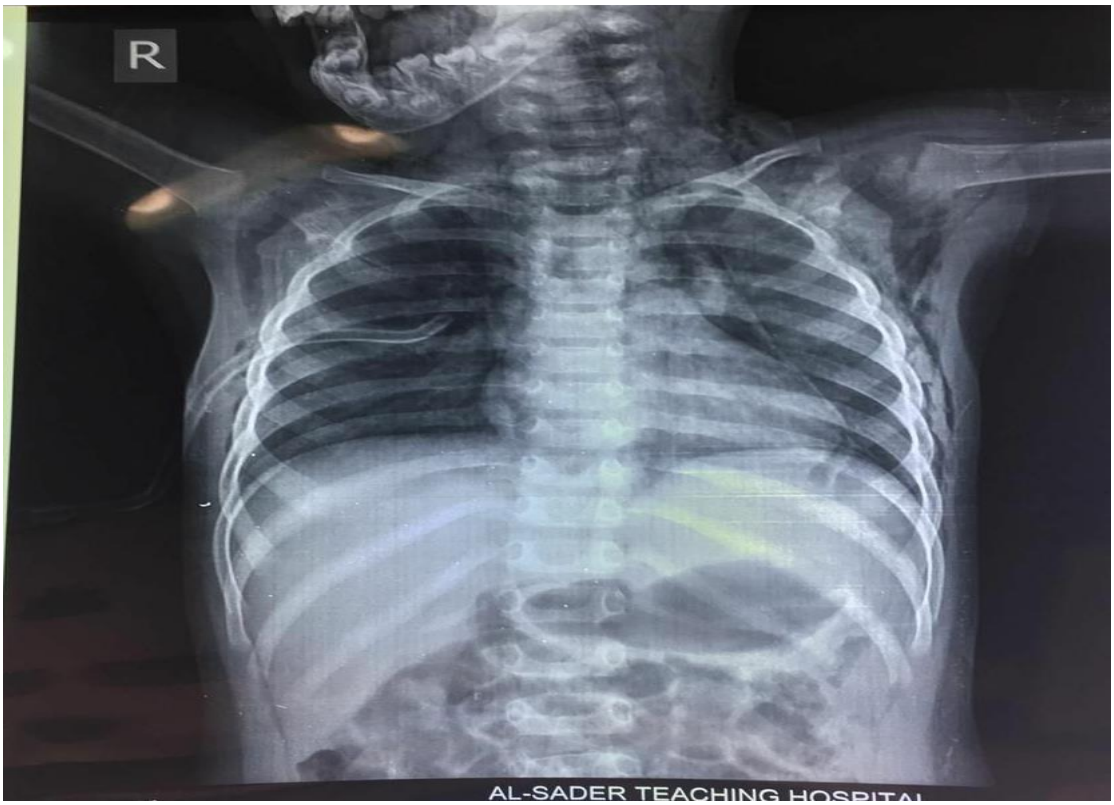

Figure 1: Rt. pneumothorax with chest tube

in Figure 1, Right-sided tension pneumothorax with subcutaneous emphysema with left tracheal and mediastinum deviation. The urgent chest tube was inserted with Good restoration of lung function.

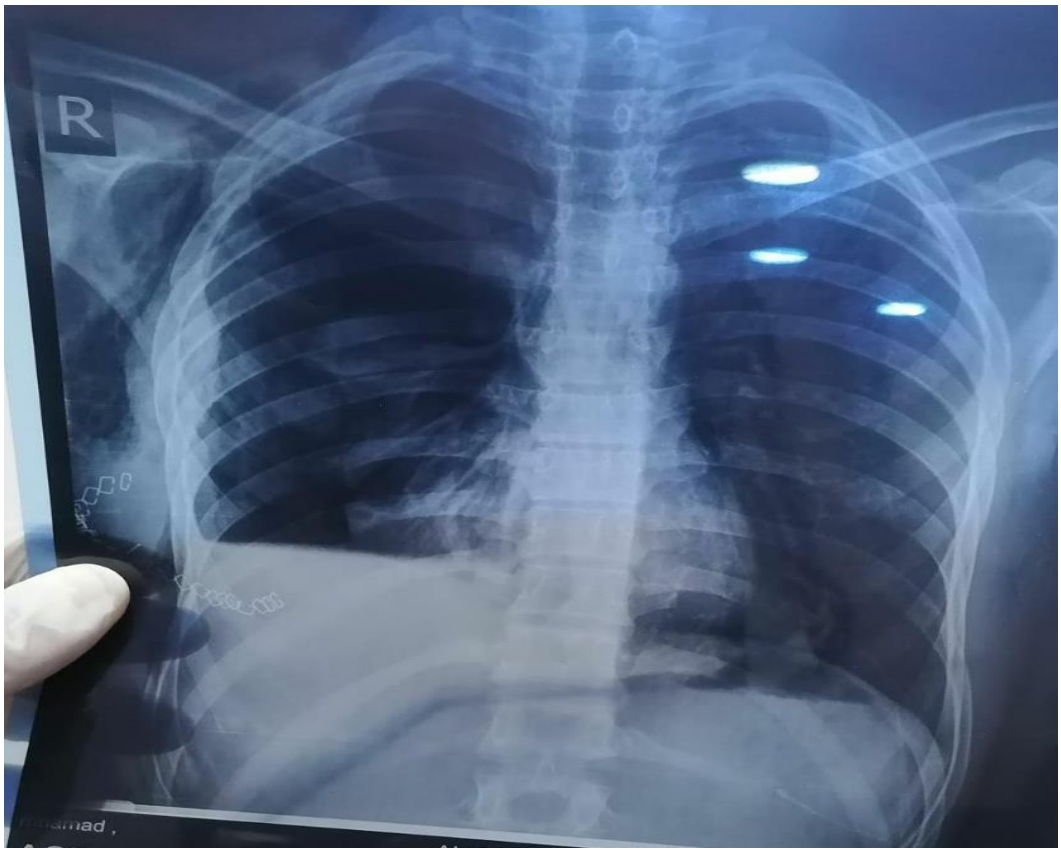

Figure 2: Rt. Hydropneumothorax

in Figure 2, Right-sided hydropneumothorax with Total right lung collapse. For urgent chest tube insertion to prevent progression to tension pneumothorax.

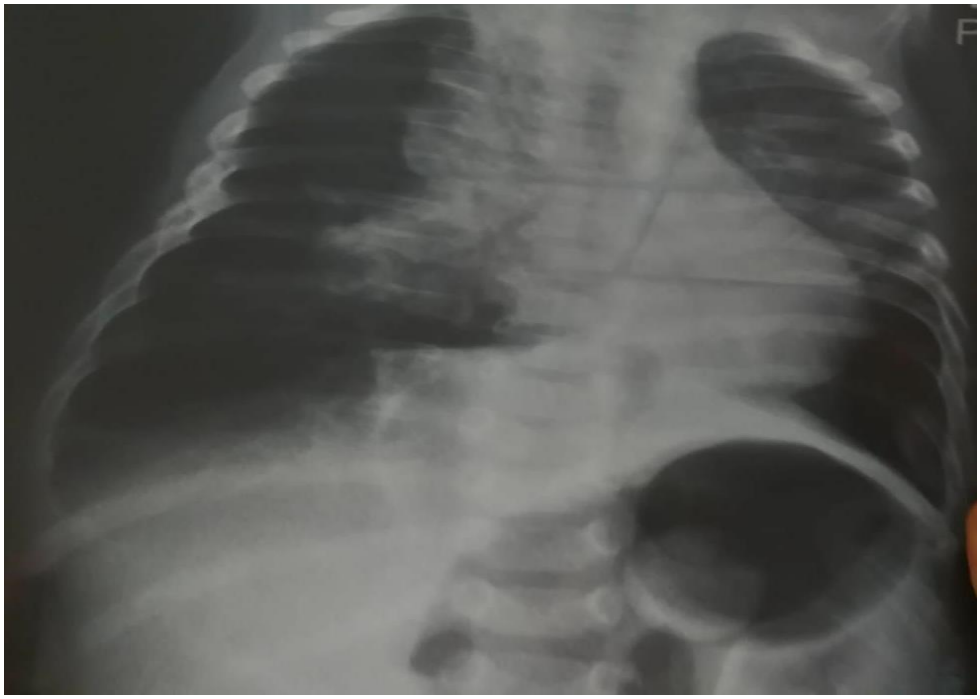

Figure 3: bilateral pneumothorax

in Figure 3, Bilateral destructive lung parenchymal disease with bilateral severe pneumothorax and lung collapse and respiratory difficulty. For urgent chest tube insertion.

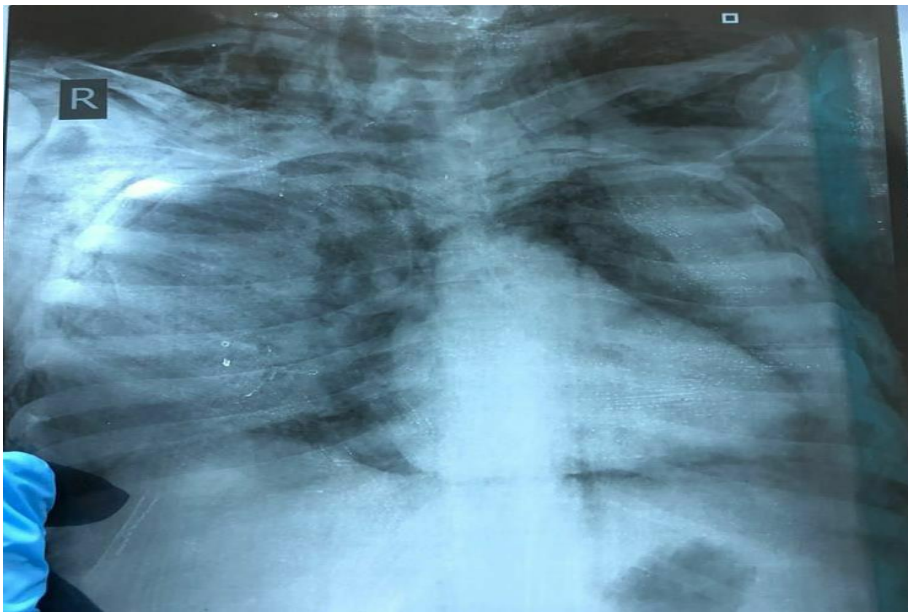

Figure 4: Bilateral subcutaneous emphysema with pneumonpericardium

in Figure 4, Bilateral diffuse subcutaneus emphysema with air trapped in both sides of lower neck pushing trachia to the right. And pneumopericardium.

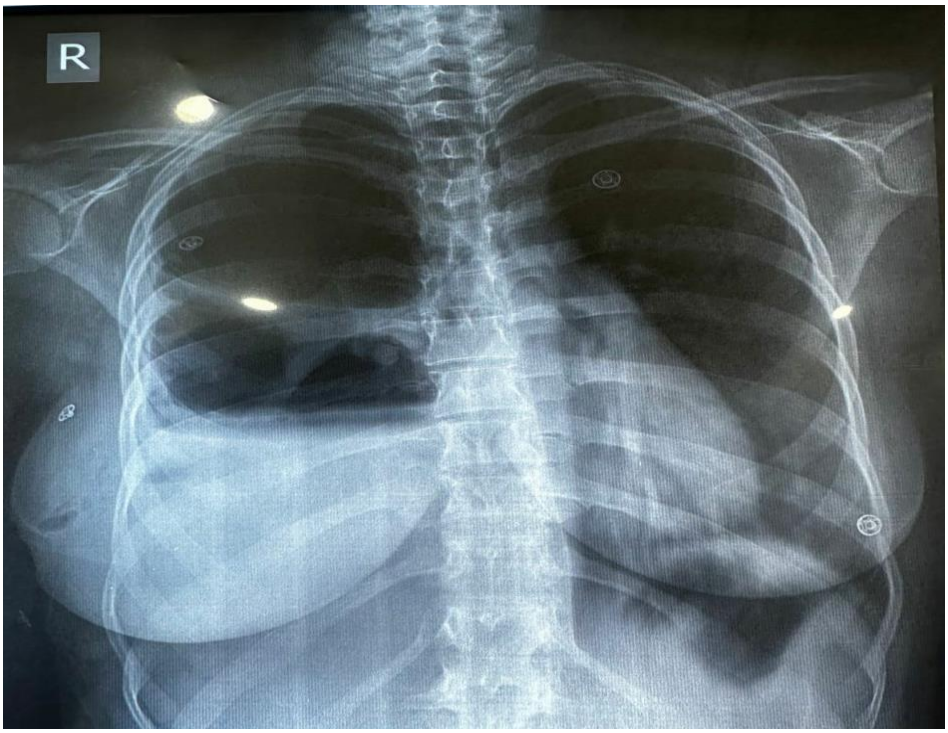

Figure 5: Rt. Hydropneumothorax

Figure 5. Tension hydro-pneumothorax with a moderate amount of pleural effusion and severe tracheal and mediastinal shift. For Which an urgent chest tube was inserted.

In Table 1, patients who smoke, those with Hypertension and chronic kidney disease (CKD), and the age and sex of the patient were taken into account, and these effects on the degree of infection and the method of treatment were studied, as well as the method of improvement and the treatment period for Diabetes Mellitus (DM) patients in general.

mortality	duration of air leak in days	management	type	smoking	CKD	Hypertension	DM	gender	age
no	5	chest tube	pnumothorax	yes	no	no	yes	m	56
no	7	chest tube	pnumothorax	yes	no	no	no	m	23
no	22	chest tube	pnumothorax	no	yes	yes	no	f	75
no	3	chest tube	pnumothorax	yes	no	no	yes	m	16
no	4	chest tube	pnumothorax	no	no	no	no	m	29
no	6	chest tube	pnumothorax	yes	no	yes	no	m	55
no	7	chest tube	pnumothorax	no	no	yes	no	f	60
no	10	chest tube	pnumothorax	no	no	no	no	f	43
no	4	Thoracotomy	pnumothorax	yes	no	no	yes	m	38
no	4	chest tube	pnumothorax	yes	no	no	yes	f	22
no	0	conservative	subcutaneous emphysema	no	no	no	no	f	20
no	7	chest tube	pnumothorax	yes	no	no	no	m	53
no	8	chest tube	pnumothorax	yes	no	no	no	m	71
no	78	chest tube	pnumothorax	yes	no	no	no	m	80
yes	10	chest tube	pnumothorax	yes	no	no	no	m	25
no	5	chest tube	pnumothorax	no	no	no	no	m	33
no	6	chest tube	pnumothorax	no	no	no	no	f	44
no	4	chest tube	pnumothorax	yes	no	no	yes	f	48
no	7	chest tube	pnumothorax	no	no	no	yes	f	59
no	5	chest tube	pnumothorax	yes	yes	no	yes	m	57
yes	7	Thoracotomy	pnumothorax	no	no	no	yes	m	52
no	0	conservative	subcutaneous emphysema	yes	no	yes	yes	m	56
no	3	chest tube	pnumothorax	yes	no	yes	yes	m	49
no	6	chest tube	pnumothorax	no	no	no	no	m	32
no	7	chest tube	pnumothorax	yes	no	no	no	m	26
no	8	chest tube	pnumothorax	yes	no	no	no	m	19
no	12	chest tube	pnumothorax	yes	no	no	no	m	69
no	7	chest tube	pnumothorax	yes	no	no	no	m	64
no	7	chest tube	pnumothorax	yes	no	no	no	m	63
no	6	chest tube	pnumothorax	no	no	no	no	f	51
no	6	thoractomy	pnumothorax	no	no	no	no	f	45
yes	31	chest tube	pnumothorax	yes	no	no	no	m	75
no	5	conservative	subcutaneous emphysema	no	no	no	yes	f	58
no	6	chest tube	pnumothorax	yes	no	yes	no	m	41
no	7	chest tube	pnumothorax	yes	no	no	no	m	35
no	5	chest tube	pnumothorax	no	no	no	no	m	43
no	8	chest tube	pnumothorax	yes	no	no	yes	m	52
no	6	chest tube	pnumothorax	yes	no	no	no	m	22

DOI: 10.5123/inj.2023.4.inj18
ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

no	4	chest tube	pnumothorax	no	no	no	no	m	21
no	0	conservative	subcutaneous emphysema	yes	no	no	no	m	28
no	3	chest tube	pnumothorax	yes	no	no	no	m	29
no	7	chest tube	pnumothorax	yes	no	no	yes	m	60
yes	4	chest tube	pnumothorax	no	no	no	yes	f	59
no	7	chest tube	pnumothorax	no	yes	yes	yes	f	68
no	5	chest tube	pnumothorax	no	no	yes	no	m	67
no	5	chest tube	pnumothorax	yes	no	no	no	m	64
no	7	chest tube	pnumothorax	yes	no	no	no	m	57
no	4	chest tube	pnumothorax	yes	no	no	no	m	46
no	4	chest tube	pnumothorax	yes	no	no	yes	m	66
no	3	chest tube	pnumothorax	yes	no	no	yes	m	67
yes	7	chest tube	pnumothorax	yes	no	no	yes	m	68

Table 1: Radiological samples for thoracic surgical complication in covid patients

Discussion

During the epidemic of COVID-19 our department was challenged with those patients suffering from persistent air leak which in the normal settings would be offered surgical solution to their condition however we were faced with a Dilemma concerning those cases who were either refusing or unfif for surgical intervention. So we decided to put them on a long term chest tube with frequent follow ups. Luckily we noticed that after a virible periods air leak stopped and chest tube were removed in all patients who survived And their mortality was no different and may be better from those who underwent surgical intervention Which gave us the idea that long term chest tube is not a bad idea in high risk COVID-19 cases with persistent pneumothorax.

In Table 1, we observed 52 patients aged between 20 and 80 years. These patients, having no notable medical history three days before their hospital admission, exhibited symptoms such as fever, fatigue, loss of smell, dry cough, and breathing difficulties. Out of these, 43 patients had sustained injuries and required a chest tube, with their PCR tests for SARS-Cov-2 returning positive. These individuals sought emergency care and were provided oxygen through a basic mask, which helped maintain an oxygen saturation level of 90%. Upon admission, a straightforward chest CT scan revealed prominent subcutaneous emphysema in the left side of the chest. This was accompanied by a right-sided pneumothorax leading to a collapse in the adjacent lung area and a significant operation for a posterior pulmonary stent. Based on these findings, a chest ostomy was recommended. The CT scan further showed notable left posterior adhesions and bilateral patchy ground-glass areas on the periphery and side, hinting at SARS-Cov-2 pneumonia. No signs of any pre-existing chronic conditions were detected. As the hospitalization extended to the 21st day and the patient's oxygen requirement increased, resulting in the inefficacy of non-invasive mechanical ventilation, another chest CT was conducted. This scan unveiled the additional complication of pleurisy (hemothorax), leading to the initiation of invasive mechanical ventilation.

Over the subsequent 48 hours, amidst ongoing circulatory and respiratory challenges, five patients who had contracted Covid-19 tragically passed away post chest tube operations. Among the group were three males aged 25, 38, and 68, along with two females, 59 and 68 years old. A particularly striking case involved a 52-year-old male with overweight concerns. Although he had no notable prior medical conditions, he had been battling a continuous fever, fatigue, and a non-productive cough for more than 15 days. Despite self-administering acetaminophen, chlorpheniramine, dextromethorphan, and pseudoephedrine, his symptoms persisted. Alarmingly, he began to experience respiratory issues. When he consulted outpatient services, he was given dexamethasone and N-acetylcysteine and was diagnosed with SARS-COV-2 following a PCR test. Owing to the severity and ongoing nature of his symptoms, he sought assistance at the emergency room. There, he displayed a concerning PaO2/FiO2 ratio of around 150, indicating a high need for additional oxygen. A notable feature was a crepitus felt under the skin near his ribcage. Given his state, he was strategically positioned face-down while awaiting mechanical ventilation. An initial chest CT scan in this prone position revealed extensive subcutaneous

emphysema in both the front and back of his chest, mild mediastinal pneumothorax, and a significant right-sided pneumothorax resulting in lung collapse. Conversely, the left lung showed increased density with a ground-glass appearance, interlobular septal thickening, and greater than 75% anterior airspace occupation. There were no signs of bullae or cavities. Tragically, after 96 hours in the hospital, post mechanical ventilation and after draining the pneumothorax, the patient's respiratory and circulatory systems severely deteriorated. This led to multi-organ failure. Despite the medical interventions applied, he did not recover and ultimately passed away.

Several overweight patients, with no other notable medical history, reported symptoms lasting over 15 days. These symptoms included fever, general malaise, and a dry cough. Despite self-medicating with acetaminophen, chlorpheniramine, dextromethorphan, and pseudoephedrine, their condition did not improve. On the contrary, they experienced a worsening of symptoms, notably shortness of breath. Subsequent outpatient consultations led to prescriptions of dexamethasone and N-acetylcysteine. PCR tests confirmed a SARS-COV-2 infection in these individuals. Their deteriorating condition and sustained symptoms prompted a visit to the emergency department, where a recorded PaO2/FiO2 ratio was approximately 150, indicating a significant need for supplemental oxygen. A concerning physical symptom was a palpable crackling sensation beneath the skin near the rib cage. Due to their critical state, they were proactively placed in a conscious prone position awaiting mechanical ventilation. Initial chest tomography in this position revealed extensive subcutaneous emphysema in both anterior and posterior chest regions, accompanied by a mild mediastinum pneumothorax and a pronounced right pneumothorax. This resulted in a collapsed pulmonary area and occupation of the adjacent airspace. In comparison, there was an enhanced attenuation in the left lung, characterized by a ground-glass pattern, thickened interlobular spacers, and an affected anterior lung space over 75% without any indications of bullae or caverns. Sadly, after a 96-hour hospital stay and interventions like invasive ventilation and pneumothorax drainage, these patients faced severe respiratory and circulatory complications, progressing to multi-organ failure. The patients did not respond to established treatment protocols and, regrettably, passed away.

In four patients, aged 20 (female), 56 (female), 28 (male), and 58 (female), who had conservative subcutaneous emphysema, chest CT scans were conducted as per hospital guidelines. The scans revealed the presence of a pneumothorax, notably a small one on the left side, accompanied by significant vitreous opacities suggestive of both peripheral and central pneumonia. This was consistent with SARS-Cov-2 infection, covering about 75% of the lung area. No other significant findings were noted. During their first three days in the hospital, there was evident worsening of hypoxia. Attempts at non-invasive mechanical ventilation were unsuccessful, necessitating invasive mechanical ventilation for around 12 days. Fortunately, there was an overall positive clinical outcome, leading to their eventual discharge from the hospital. Surgical intervention for the pneumothorax was not required.

In patients with Diabetes Mellitus (DM) in general, the method of their treatment depends on the severity of the infection with Covid. In the case of severe infection, we notice difficulty in treating them in terms of the long duration of treatment as well as the type of treatment used. As for mild and moderate cases of infection, regular initial treatments can be performed for them, Table 1 illustrates this.

Acknowledgments

Authors' contributions

EP: conceptualization, statistical analysis, patient recruitment, paper writing, and revision. RT: data collection, statistical analysis, and paper writing. VA: paper revision and patient recruitment. SE: paper revision and patient recruitment. BC: Patient recruitment and data collection. FT: patient recruitment and data collection. GLN: patient recruitment and data collection. We declare that all authors have read the paper and approved its content.

Funding: No funding to declare.

Availability of data and materials: The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate: The study was approved by the medical college/ Basrah City Policlinic Ethical Committee (approval protocol No.030409-016-2023).

Consent for publication: Not applicable.

Competing interests: The authors declare no competing interests.

Conclusion:

For the 43 injured patients, chest tubes were administered to maintain oxygen saturation. Upon admission, an immediate chest CT scan was conducted, revealing pronounced subcutaneous emphysema on the left side of the chest and a right-sided pneumothorax with negative atelectasis on the same side. There was also evidence of a significant posterior pulmonary stent procedure, prompting the decision for a chest ostomy. Unfortunately, five patients who showed signs of Covid-19 infection succumbed post chest tube procedures.

In other patients who exhibited conservative subcutaneous emphysema, chest CT scans were undertaken. These scans highlighted a small pneumothorax on the left and extensive vitreous opacities indicative of potential peripheral and central pneumonia. Within the initial three days of hospitalization, worsening hypoxia was observed, and non-invasive mechanical ventilation was provided. The epidemic of COVID-19 was a challenging unexpected event for health care providers in this century. And what makes things more challenging was the fact that no guidelines whatsoever was available to aid clinicians to deal with these cases . Our department with the help from our general health directorate and after thorough discussion with our intensive care specialists and respiratory physicians have reached a management plan to deal with yhe different aspects concerning those patients. It was agreed that chest tube was the initial management in all cases of spontaneous pneumothorax whether primary or secondary and thoracotomy was the answer for persistent pneumothorax, However the main point of debate was patient with persistent pneumothorax whom either refused surgery or were deemed unfit for operation. Tlin those patients decision was reached that it's possible to put them on long term chest drains and frequent follow ehich was very satisfactory sins air leak tend to stop after a while (which is already shown) in the results tables.

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