ORIGINAL ARTICLE
Turk J Surg 2022; 38 (4): 401-408

Incidence of chylothorax over nineteen years of transhiatal esophagectomy: A case series and review study

Rahim Mahmodlou[1], Awat Yousefiazar[2]

[1] Department of General Surgery, Urmia University of Medical Sciences, Urmia, Iran

[2] Department Anesthesia and Surgical Technology, Urmia University of Medical Sciences School of Allied Medical Sciences, Urmia, Iran

ABSTRACT

Objective: Chylothorax (CTx) is the leak and accumulation of lymphatic fluid within the pleural cavity. The incidence of CTx has the highest rate after esophagectomy. This study aimed to present three cases of post-esophagectomy chylothorax among 612 esophagectomies that were performed over 19 years, in which post-esophagectomy chylothorax was reviewed in terms of risk factors, diagnosis, and management.

Material and Methods: Six hundred and twelve patients were included in the study. Transhiatal esophagectomy was used for all patients. In three cases, chylothorax was detected. In all of the three cases, secondary surgery was performed for the management of chylothorax. Mass ligation was performed for the first and third cases having leak from the right side. In the second case, the leak was from the left side without prominent duct; and despite mass ligation that was done several times, no significant reduction in chyle was observed.

Results: In the first case, in spite of reduced output, the patient gradually progressed to respiratory distress. His condition deteriorated over time and he died after three days. In the second case that needed third surgery, the patient's condition deteriorated and she died after two days due to respiratory failure. The third patient had postoperative recovery. The patient was discharged on fifth day after the second operation.

Conclusion: In post-esophagectomy chylothorax, the key to preventing high mortality rates can be the identification of risk factors as well as timely detection of symptoms and proper management. Besides, early surgical intervention should be considered to prevent early complications of chylothorax.

Keywords: Chylothorax, transhiatal esophagectomy, post-esophagectomy chylothorax

INTRODUCTION

Chylothorax (CTx) is the leak and accumulation of lymphatic fluid, enzymes, and immunoglobulins within the pleural cavity following obstruction or leakage of the main thoracic duct (TD) or one of its branches (1,2). The etiology of chylothorax can be divided into spontaneous and traumatic categories. Non-traumatic or spontaneous type may have congenital, infectious, or neoplastic causes. Among the various etiologies, the most common factor of traumatic CTx is a surgical complication occurring following thoracic surgeries (2).

Among thoracic procedures, the incidence of CTx has the highest rate after esophagectomy and has been reported between 0% and 21% in various studies (1-5).

Diagnosis of chylothorax should be considered in conditions in which the chest tube drainage is milky or when the quantity of secretions is high. Confirmatory test may include sending a sample of the chest tube secretions for laboratory examination, which will be diagnosed by the presence of chylomicrons in lipoprotein analysis of pleural fluid (1,5). Beginning enteral feeding with olive oil and measuring serum triglyceride levels for diagnosis of chylothorax will also be helpful. Chylothorax is confirmed when triglyceride levels are >110 mg/dL (1).

Although chylothorax is a relatively uncommon complication after esophagectomy, it is lethal and is associated with high morbidity and mortality rates (3-5). Chylothorax is a serious pathology that can prevent lung expansion and lead to complications such as mediastinal shift (pulmonary malfunction), immunocom-

Cite this article as: Mahmodlou R, Yousefiazar A. Incidence of chylothorax over nineteen years of transhiatal esophagectomy: A case series and review study. Turk J Surg 2022; 38 (4): 401-408.

Corresponding Author
Awat Yousefiazar
E-mail: yousefiazar.a@umsu.ac.ir

Received: 08.07.2022
Accepted: 12.09.2022
Available Online Date: 20.12.2022

DOI: 10.47717/turkjsurg.2022.5821

promise, metabolic disarrangement, malnutrition, as well as intake and output imbalances (3,5). Patients with CTx typically have complaints of respiratory distress, dyspnea, chest pain and cough, which are similar to a pleural effusion exerting mechanical pressure on the heart and lungs (2). Long-term complications of CTx can include lymphocytopenia (peripheral lymphocytes in a circulation <1.500), which will be directly associated with a longer period of chyle leak (2,6).

The underlying cause of postoperative chylothorax may be inadequate identification and poor thoracic duct exposure during esophagectomy (4). When the surgeon releases esophagus and removes the mediastinal lymph nodes in adipose tissue surrounding the thoracic duct, poor visualization may damage the thoracic duct (1,7).

Currently, identifying the risk factors for chylothorax remains a controversial issue (3). In various studies, factors such as high BMI, neoadjuvant treatment, transhiatal esophagectomy, tumor type, serum albumin levels, and underlying diseases have been identified as predictors for chylothorax after esophagectomy (8,9).

At present, there is no standard consensus regarding the therapeutic strategy and optimal management of chylothorax given the lack of clinical trials meant to introduce therapeutic interventions (3,10). Furthermore, given the low incidence of chylothorax, few studies with a low sample size have addressed it (1). Conservative treatments include low-fat diets, TPNs, octreotide and supportive care (3,6). In addition, invasive procedures such as pleurodesis, lymphangiography followed by coiling and embolization and even radiotherapy are among the accepted alternative treatment modes (3). If conservative treatment is not successful, surgical intervention for thoracic duct ligation is considered by thoracotomy or thoracoscopic procedure although it may be associated with increased recovery time, longer hospital stay as well as morbidity and mortality rate (3,6). However, there are no studies suggesting the exact timing of revision surgery (1).

Most studies have reported CTx as a fatal complication; therefore, what emerges from the studies is that the inconsistency in the identification of risk factors as well as the lack of a standard treatment algorithm emphasizes the importance of this issue and that further studies are needed to detect risk factors, methods of management and treatment of chylothorax.

In this regard, we conducted this study with the aim of presenting three cases of chylothorax that occurred out of 612 cases of esophagectomy performed over nineteen years, and we also reviewed post-esophagectomy chylothorax in previous studies in a more comprehensive manner in terms of risk factors, diagnosis and management.

MATERIAL and METHODS

This is a retrospective case series and review study involving a total of 612 patients suffering from esophageal adenocarcinoma or squamous cell carcinoma who underwent transhiatal esophagectomy at Imam Khomeini University Hospital of Urmia University of Medical Sciences from December 2002 until January 2022.

To include data in the study, informed consent was obtained from the patient/guardian or legally authorized representative. Mean age of the patients was 61.06 ± 11.89 years. The youngest and oldest patients were 17 and 91 years old, respectively. Three hundred and forty-seven patients (56.6%) were males and 265 (43.2%) were females. All patients with remote metastasis and invasion to the trachea or great vessels were excluded from the operation.

Patients who had undergone surgery before 2011 did not receive neoadjuvant therapy but all esophagectomies after that period were subject to surgery after neoadjuvant therapy (except for three cases that were in T2). All patients underwent metastasis workup using chest, abdomen and pelvic CT-SCAN with oral and intravenous contrast. Fiber-optic bronchoscopy was done for all patients with mid esophageal cancer.

Surgical Technique

The operation started under general anesthesia in the rose position with a roll between shoulders, after insertion of Foley catheter and nasogastric tube. Aside from noninvasive monitoring, arterial monitoring was done during the operation.

After upper midline laparotomy and exploring the abdomen, gastrolysis was done on the base of right gastroepiploic artery and extensive kocherization was performed. However, no pyloroplasty or pyloromyotomy was done in any case.

The diaphragm was radially incised and hiatus dilated after releasing the cardia and ligating of veins in the inferior surface of the diaphragm.

In the cervical phase of surgery, an incision was made in the anterior border of the left sternocleidomastoid, and after incising the strap muscles, exploring recurrent nerve and ligations of inferior thyroid artery, the esophagus was encircled by Penrose drain. In this stage, right aberrant subclavian artery must be born in mind.

In the mediastinal step of the surgical procedure, the posterior aspect of the esophagus was freed from the vertebral column, bluntly. Subsequently, a Deaver retractor was inserted from the dilated hiatus, and the anterior of the esophagus was dissected sharply under direct vision as far as possible. Then, using the right hand that was inserted into the thorax from the dilated hiatus, with the aid of the index and mid fingers of the left hand

from above, the trachea was elevated and thoracic dissection completed. Cervical esophagus was incised from 3-4 cm below the upper esophageal sphincter and delivered to the abdomen surgical wound.

Once again, the diaphragm was elevated with Deaver retractor and under direct vision, lower mediastinal lymphadenectomy was done sharply as high as possible.

In the next step, a gastric conduit was created using linear stapler and the staple line was reinforced with 000 silk stitches. Gastric conduit was guided from below to the neck, through the posterior mediastinal route, and esophagogastrostomy was done with 000 silk Gambee sutures.

Diaphragmatic hiatus was repaired with 0 silk U stitches, feeding jejunostomy was created with 16 French Foley catheter, and bilateral chest tube was inserted routinely in all patients.

Postoperative Management

After the surgery, all patients were transferred to intensive care unit and extubated there 36-48 hours after operation, starting feeding from the jejunostomy tube. On the first postoperative day, a chest x-ray was taken for monitoring the location of chest tubes, and the drainage tube was removed when the drainage of the chest tube decreased to >100-150 mL per 24 hours.

Chest tubes were removed in all 612 patients except for three cases. Unlike other patients, in these three cases, the chest tubes output was increased to an average of >500 mL until the fifth postoperative day.

Postoperative Case Presentation

The first case was a 72-year-old male with adenocarcinoma at the distal third of the esophagus who was operated on in September 2010. For this case, no neoadjuvant therapy was performed.

The second case was a 62-year-old female with adenocarcinoma in the distal third of the esophagus who was operated on in March 2018. In this case, there was a six-month interval between neoadjuvant therapy and surgery.

The third case was a 71-year-old male suffering from poorly differentiated squamous cell carcinoma at the middle third of the esophagus who was operated in January 2019. Also in this case, there was an interval of 42 days between neoadjuvant therapy and surgery.

In the first and third cases, chylothorax was identified on the right side, and in the second one, it was on the left side. Color of the secretions was serosanguinous in all cases in the early phases. In all cases, the triglyceride level of the secretions was <110 mg during the early phases. In all cases, after initiation of enteral feeding via Jejunostomy tube, the color of the chest tube secretions changed to milky, which confirmed post-esophagectomy chylothorax. Therefore, conservative route was chosen as the initial treatment. Our conservative treatment plan was keeping NPO and total parenteral nutrition (TPN) as well as medication therapy with octreotide. As a result, feeding on jejunostomy tube was discontinued and TPN started via central venous catheter. Unfortunately, it was not successful at either of the cases and we had to operate all three cases.

A second surgery was performed in all three cases via right posterolateral thoracotomy. Olive oil was given via jejunostomy tube during operation to facilitate perfect visualization of the thoracic duct and identify chyle leakage.

In the first and third cases, where leakage was from the right side, the chyle leak was seen obviously as soon as the gastric conduit was set aside from the vertebral column. The leakage location was approximately 4-5 cm below the azygos arch. After identifying the exact location, mass ligation was performed with 00 silk suture 2-3 cm below the leakage site, which immediately resulted in elimination of chyle leak. Before closing the chest cavity, another dose of olive oil was given through the jejunostomy tube, and the chest cavity was closed after reassuring that the leak was discontinued.

In the second case, the leak was from the left side and obvious chyle leak was seen from the hiatus without prominent duct. Despite mass ligation by suture several times with 00 silk, no significant reduction occurred. After mechanical abrasion with gauze and chest tube insertion, the thoracic incision was closed.

Postoperative Period of the Second Operation

First Case

Chest tube drainage reduced significantly in the first patient who had right side leakage. Although the patient had a semi-liquid diet, maximum chest drainage was 200 mL of serosanguinous fluid after five days. Therefore, the chest tube was removed on the fifth day after the second surgery.

The patient became dyspneic two days after chest tube removal. Chest X-Ray showed pleural effusion with right lower lobe collapse. Therefore, once again a chest tube was inserted and 400 mL serosanguinous fluid evacuated from the pleural space. Although the patient had a semi liquid diet, the color of the secretions was serosanguinous. The triglyceride level of fluid and albumin level of serum were 12 mg/dL and 2 gr/dL, respectively. Despite continuing feeding from jejunostomy tube, chest tube output decreased to <150-200 cc/24 h compared to the first day. In spite of reduced output, we did not remove the chest tube for reassurance. The patient gradually progressed to respiratory distress. Due to deterioration of his respiration, chest CT-SCAN was performed that showed air bronchogram in the

right lower lobe without any significant pleural effusion. Despite the administration of continued intravenous antibiotics, the patient's condition deteriorated, and atrial fibrillation was added to his problems. Therefore, we had to intubate the patient and return him to the intensive care unit. Unfortunately, his condition deteriorated gradually, and he was deceased after three days.

Second Case

After the operation, the output of the left side chest tube reduced in this patient, but her right chest tube output increased nearly 1000 mL daily and became milky. In other words, the side of chylothorax was changed. We managed conservatively two days without any reduction in chest tube output; therefore, the patient was scheduled for another operation.

Due to the failure of the second surgery from the right side, the third operation was done from the left side. Left posterolateral thoracotomy was done from seven intercostal space. Unfortunately, we were faced with a scenario like the previous operation. The chyle was boiling from hiatus without obvious duct. It seemed that the chyle originated from the abdomen. Therefore, we did mass ligation that was not successful and the chest was closed after chest tube insertion. After the operation, the patient was transformed to intensive care unit. Unfortunately, not only did her chest tube output remain unchanged but also her condition deteriorated and she died after two days as a result of respiratory failure.

Third Case

The third patient had eventless post-op, and chest tube drainage reduced dramatically in him. Semiliquid diet was started on the third day after operation. Chest tube drainage was not significant, and chest-X-ray showed full lung expansion. Therefore, we removed the chest tube and the patient was discharged on fifth day after the second operation. During the nine month follow up, the patient showed no problems.

DISCUSSION

Chylothorax is among the deadly complications of esophagectomy, especially in those who are subject to it for the treatment of esophageal cancer. Although it may have a low incidence, chylothorax is associated with high mortality and morbidity rates (4,8). The chance of death in patients with chylothorax is increased fivefold during hospitalization and remains high until the 30th day after surgery. The mortality rate is also significantly high over 90 days after esophagectomy (9,11-13). In our study, we lost two out of three patients (mortality rate of 66%).

Risk Factors

Although chylothorax can occur following any type of cardiothoracic surgery, the close association of the thoracic duct with the esophagus can cause accidental damage to the thoracic duct and increase the incidence of chylothorax in esophagectomy (8,11,14). In other words, lack of visualization of the thoracic duct and its proximity to thoracic esophagus is the major cause of iatrogenic injury during surgery that can lead to chylothorax (9).

Another controversial issue is that the incidence of this complication has not been determined accurately and that there are major differences between various reports in this regard (8,12,13,15,16). There is considerable difference between studies regarding the reports of post- esophagectomy chylothorax, with low incidence in our patients but higher prevalence reported in other studies (2,17). In addition, there are no documented risk factors for post-esophagectomy chylothorax, although several issues have been addressed in this respect (3).

Many studies have identified squamous cell carcinoma (SCC) as one of the risk factors of chylothorax (9,12,16,18,19). SCC often causes lesions in the middle part of the esophagus that is close to the thoracic duct (12,20). A possible explanation is that in the thoracic cavity, the thoracic duct is completely in contact with aorto-oesophageal groove, where in the midline position at the level of thoracic vertebrae T4 to T6, it crosses from the right side to the left hemithorax (9,21). Surgical manipulation in these areas can increase the possibility of damage to the thoracic duct. However, in the present study, most cases were SCC patients, and out of three cases of chylothorax, only one was afflicted with SCC. It can be concluded that the low incidence of chylothorax in our study does not support the results of previous investigations.

Du et al. (4). and Shah et al. (9) in separate studies have reported that in addition to SCC, tumor location, tumor staging, and nodal status will increase the likelihood of chylothorax since they are associated with difficulty in surgery. The reason for the association between the stage of tumor and increasing risk of chylothorax is that the thoracic duct is more likely to be subjected to mechanical damage in more advanced tumors where the lymph node involvement is wider, requiring further dissection and lymphadenectomy (3,4). However, C. Bolger et al. (11), Batol et al. (1) and Hou et al. (22) have stated that they found no significant effect of tumor location, tumor pathology category, TNM stage and histology type on post-esophagectomy chylothorax. In the present study, all three chylothorax cases had operable tumors. In the last two cases, we performed endoscopic ultrasound, which indicated a locally advanced stage; therefore, we scheduled them to preoperative chemo-radiotherapy. It should be noted that we did not perform neoadjuvant therapy in the first case because we did not have access to endoscopic ultrasound, and due to the absence of screening tools in our country before 2011, diagnosis of esophageal cancer in T1 N0M0 was unusual. In general, from the viewpoint of tumor stage, some cases were locally advanced, but all 612 patients were operable.

Another controversial issue about predisposing factors is the type of surgical procedure, namely transthoracic versus transhiatal (7). Rationally, in transthoracic approaches such as Ivor Lewis and Mckeown surgical procedures, if prophylactic thoracic duct mass ligation is done, it is expected that the occurrence of chylothorax should be lower than transhiatal operation that is nearly blind (23). However, reported documents show controversial issues (7,18,23-26). In this regard, Tsoon et al. (5) have reported 14 cases (9%) of chylothorax out of 155 transthoracic esophagectomies. In a study by Stefano et al. (23), it has been reported that the incidence of chylothorax in patients operated through a transthoracic approach was 1%, while in transhiatal esophagectomy, there was 1.3% prevalence of chylothorax. Kranzfelder et al. (8), Gupta et al. (12) and Varshney et al. (19) have also suggested that the type of surgery has no effect on chylothorax.

Body mass index (BMI) is another issue addressed as a risk factor for this complication. In various studies, BMI< 25-30 is considered as a predisposing factor (1,4,9,18). The reason for this may be that during surgical manipulation, the adipose tissues around the thoracic duct prevents it from damage (18).

Since in patients with BMI> 25, the passage of fingers from two hands in the hiatus and neck surgical site is difficult, in the present study, only the patients who had BMI< 25 were selected for transhiatal surgery.

Diagnosis of Post-esophagectomy Chylothorax

Accurate diagnosis of the cause of chylothorax is the key to determining the ideal course of treatment for each individual. Since chyle is rich in lymph and free of fatty acids, chylothorax can rapidly lead to severe nutritional and immune disorders, necessitating immediate closure of the leak site (2).

One of the distinctive signs of post-surgical chylothorax is chest tube output. The increase of which must arouse suspicion of chylothorax (1,27,28). In a study by Batol et al. (1), a significant increase has been found in secretions in the group that had chylothorax. They have also suggested that an increase in chylothorax secretion from day four to >100 mL could be associated with a high rate of chylothorax occurrence. Shah et al. (9) have also claimed that a high suspicion of chylothorax in patients with chest drainage exceeding 4 mL/kg (400 mL) may be useful for early diagnosis of chylothorax, despite the appearance of drainage. In the present study, in all three cases, chest tube output was significantly higher than other cases and reached an average of >500 mL until the fifth postoperative day, which increases the suspicion of chylothorax and denotes the importance of the chest tube borderline laboratory tests.

Another golden clinical clue in the diagnosis of chylothorax is the changing color of the chest tube secretions to milky after starting enteral feeding orally or via jejunostomy tube that leaves no doubt about the diagnosis (2,18,29). On the other hand, it must be remembered that although massive milky pleural effusion in a post-esophagectomy patient confirms the diagnosis of chylothorax, the absence of it does not rule out the diagnosis of chylothorax (2,28), especially in NPO patients (30). Similar to the report of Stefano et al. (23), in our study, the drainage of chest tube in all cases during the primary phase had serosanguinous appearance and showed ambiguous laboratory results that were common; however, it changed to milky color after the start of enteral feeding. In other words, it should be noted that liquid color is merely a subjective assessment that must not be invoked for an accurate diagnosis (28) because it can be deceptive. Although the milky appearance of secretions can confirm the diagnosis, only half of the cases show a classic milky appearance of the chest drainage (8,18,30).

In laboratory reports, triglyceride (TG) levels are used as a simple screening test to detect chylothorax. In assessing triglyceride levels, if TG level is >110 mg/dL, the chances of not having chylothorax in the patient is <1%; if TG level is <50 mg/dL, the probability of chylothorax is <5%; and in the borderline values, measurement of chylomicron level is recommended (5,18,26,29,30). In the present study, TG level in the primary phase among all three cases was <110 mg/dL, which may be due to fasting of our patients during examination or low laboratory sensitivity. However, after the appearance of profuse milky outputs of chest tubes, there was no doubt about the diagnosis.

Clinical suspicion is an important factor in the diagnosis of chylothorax, especially in the early phase of the disease when the patient is fasting. Therefore, patients with prolonged and profuse postoperative pleural effusion should be carefully monitored. If pleural effusion due to chylothorax is suspected, fluid analysis should be performed and repeated if still suspected (8,26).

In addition to chest CT-scan, lymphangiography is another way to determine the exact location of the chyle leak, which could also be used as a conservative therapeutic technique (13,19,31,32). However, lymphangiography is not widely used as a clinical routine, particularly in postoperative cases (8,30).

Treatment for Post-esophagectomy Chylothorax

Rapid loss of chyle can lead to systemic hypovolemia, respiratory disorders, and malnutrition. In addition, significant loss of immunoglobulins, T lymphocytes and proteins can cause immune compromise and ultimately will develop the risk of infectious disorders, including pneumonia. All of the above mentioned facts denote the importance of effective treatment (5,9).

Management of chylothorax may be conservative or surgical. Conservative treatment consists of administration of octreotide

and etilefrine (33), nutritional support (13,34,35), drainage of pleural space and lung expansion (13), and reduction of chyle production with the hope of spontaneous closure (2,13).

Drainage of the pleural cavity plays a key role in measuring the output of chyle as well as resolving and preventing respiratory complications by assisting in lung expansion and in closure of leakage (21,30,36). Meanwhile, in post-surgical patients who have already had a chest tube, loculated collections should be drainages (37). After resuscitation, drainage of the pleural space and full expansion of the lungs are the next priorities for the reduction of chyle (30). We did chest CT-SCAN in all three cases for exploring the collection in a hidden area of the chest.

Keeping NPO and TPN is a time-honored early treatment for post-surgical chylothorax with variable success rates (21,30,34,35,38), and it was our primary treatment plan. As an adjunctive to TPN and fasting, somatostatin and its analogs such as octreotide have been suggested by some authors (13,14,21,30,31), and we administrated it in two patients without a successful outcome. In a study, P. Guillem et al. (33) have claimed that etilefrine infusion could cease chyle flow in a few days.

The most important issue in conservative treatment is how long it must be continued before reoperation. In other words, should all post-surgical chylothorax patients be prescribed with a single treatment plan?

Traditionally, TPN and conservative management of chylothorax must continue for two weeks (39), but it has been questioned by some authors (13,18,21,23), particularly when the output of the chest heralds that spontaneous closure is uncertain (18) as in our patients who all had more than 500 mL daily output and none of them responded to conservative treatment.

Surgery is the mainstay of treatment if conservative treatment goes wrong, and it should be done as the primary treatment when data such as volume of chylothorax fades spontaneous closure with a high percentage of success (2,21,23).

Surgery can be done through a thoracoscopic or thoracotomy (10,13,21), although the studies have not stated variation in success results for thoracoscopic vs. thoracotomy (10). In the present study, in all three cases, we performed open thoracotomy following failure of conservative treatment.

A questionable matter about surgical approach is the side of the operation, especially when the culprit side is in the left hemithorax (36). Because of the proximity of the thoracic duct to the right side of vertebral column, its ligation from the right hemithorax is easier than left hemithorax (21). This may lead the surgeon to operate on the right hemithorax for ligation of the thoracic duct despite the fact that chylothorax is in the left side as practiced by us for one of the patients.

For better visualization of leakage and injured thoracic duct, it is recommended that just before starting the operation, fatty liquid diet be given enterally, and we gave olive oil for all our patients (4,30).

During surgery and after exploring the chest cavity, the best scene for the surgeon is obvious leaking in the path of the thoracic duct. In these conditions, the best approach is the direct ligation of the thoracic duct with surrounding tissue (2,26), as practiced in two of our patients. If the location of the leak is not directly identifiable during the operation, the recommended approach in this situation is supradiaphragmatic mass ligation of the thoracic duct where it enters the thoracic cavity (26). If the intervention is successful, the leakage will stop instantly and does not increase despite giving oils such as olive via jejunostomy tube or nasogastric tube as was done in two cases of the present study in whom leakage was obvious 3-4 cm below the azygous arch. Mechanical pleurodesis is usually done at the end of the operation (2). Failure of ligation is the worst event for the surgeon as it may be apparent during surgery or in postoperative period with increasing chest tube output. The pleuroperitoneal shunt has been suggested by some authors with questionable results pertaining to the manipulation of the peritoneum during the first operation (2).

CONCLUSION

Chylothorax remains a challenging and potentially life-threatening postoperative complication after esophagectomy. However, the key to preventing high mortality rates can be the identification of risk factors as well as timely detection of symptoms and proper management. According to the results of the present study, consistent with previous studies, it can be concluded that if the drainage discharge is more than 500 mL on the fourth or fifth days post-surgery, there is a suspicion of chylothorax, and fluid analysis must be immediately performed to avoid delay in diagnosis. Besides, early surgical intervention and thoracic duct ligation should be considered to prevent early complications of chylothorax and avoid the increase of mortality rates, especially when data such as volume of chylothorax fades spontaneous closure with a high percentage of success.

Ethics Committee Approval: This study was approved by Urmia University Medical Sciences Research Ethics Committee (Decision no: IR.UMSU.REC.1401.324, Date: 02.11.2022).

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – RM; Design – RM, AY; Supervision – RM; Data Collection and/ or Processing – RM, AY; Analysis and/or Interpretation – RM, AY; Literature Search – RM, AY; Writing Manuscript – RM, AY; Critical Reviews – RM.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

1. Batool S, Akbar SA, Khan M, Sayyed R, Shakeel O, Syed AA, et al. Risk factors for chyle leak after esophagectomy. J Ayub Med Coll Abbottabad 2019; 31(4): 506-11.
2. Bender B, Murthy V, Chamberlain RS. The changing management of chylothorax in the modern era. Eur J Cardiothorac Surg 2016; 49(1): 18-24. https://doi.org/10.1093/ejcts/ezv041
3. Chen S, Zhao Y, Chen H. Risk factors of chylothorax after esophagectomy. J Thorac Dis 2019; 11(5): 1749-52. https://doi.org/10.21037/jtd.2019.05.17
4. Du ZS, Li XY, Luo HS, Wu SX, Zheng CP, Li ZY, et al. Preoperative administration of olive oil reduces chylothorax after minimally invasive esophagectomy. Ann Thorac Surg 2019; 107(5): 1540-3. https://doi.org/10.1016/j.athoracsur.2018.10.053
5. Lo STW, Lam KH, Lam HY, Wong KKF, Leung SK. Postoesophagectomy chylothorax: A single-centre, 14-year review. Surg Pract 2019; 23(3): 87-94. https://doi.org/10.1111/1744-1633.12365
6. Majdalany BS, El-Haddad G. Contemporary lymphatic interventions for post-operative lymphatic leaks. Transl Androl Urol 2020; 9(1): 104-13. https://doi.org/10.21037/tau.2019.08.15
7. Oshikiri T, Takiguchi G, Miura S, Goto H, Otsubo D, Hasegawa H, et al. Thoracic duct resection during esophagectomy does not contribute to improved prognosis in esophageal squamous cell carcinoma: A propensity score matched-cohort study. Ann Surg Oncol 2019; 26(12): 4053-61. https://doi.org/10.1245/s10434-019-07627-x
8. Kranzfelder M, Gertler R, Hapfelmeier A, Friess H, Feith M. Chylothorax after esophagectomy for cancer: Impact of the surgical approach and neoadjuvant treatment: Systematic review and institutional analysis. Surg Endosc 2013; 27(10): 3530-8. https://doi.org/10.1007/s00464-013-2991-7
9. Shah RD, Luketich JD, Schuchert MJ, Christie NA, Pennathur A, Landreneau RJ, et al. Postesophagectomy chylothorax: Incidence, risk factors, and outcomes. Ann Thorac Surg 2012; 93(3): 897-904. https://doi.org/10.1016/j.athoracsur.2011.10.060
10. Reisenauer JS, Puig CA, Reisenauer CJ, Allen MS, Bendel E, Cassivi SD, et al. Treatment of postsurgical chylothorax. Ann Thorac Surg 2018; 105(1): 254-62. https://doi.org/10.1016/j.athoracsur.2017.07.021
11. Bolger C, Walsh T, Tanner W, Keeling P, Hennessy T. Chylothorax after oesophagectomy. Br J Surg 1991; 78(5): 587-8. https://doi.org/10.1002/bjs.1800780521
12. Gupta R, Singh H, Kalia S, Gupta R, Singh R, Verma G. Chylothorax after esophagectomy for esophageal cancer: Risk factors and management. Indian J Gastroenterol 2015; 34(3): 240-4. https://doi.org/10.1007/s12664-015-0571-6
13. Martucci N, Tracey M, Rocco G. Postoperative chylothorax. Thorac Surg Clin 2015; 25(4): 523-8. https://doi.org/10.1016/j.thorsurg.2015.07.014
14. Bello SO, Rahamim J. High-dose intravenous octreotide is safe and may be superior to surgery in managing severe postesophagectomy chylothorax in high-risk patients. Ann Thorac Surg 2015; 100(1): 297-9. https://doi.org/10.1016/j.athoracsur.2014.08.058
15. Malibary N, Manfredelli S, Almuttawa A, Delhorme J-B, Romain B, Brigand C, et al. Evaluating the surgeon's experience as a risk factor for post-esophagectomy chylothorax on a four-year cohort. Cureus 2020; 12(6): 8696. https://doi.org/10.7759/cureus.8696
16. Fujita T, Sato T, Sato K, Hirano Y, Fujiwara H, Daiko H. Clinical manifestation, risk factors and managements for postoperative chylothorax after thoracic esophagectomy. J Thorac Dis 2019; 11(3): 198-201. https://doi.org/10.21037/jtd.2019.02.31
17. Brinkmann S, Schroeder W, Junggeburth K, Gutschow CA, Bludau M, Hoelscher AH, et al. Incidence and management of chylothorax after Ivor Lewis esophagectomy for cancer of the esophagus. J Thorac Cardiovasc Surg 2016; 151(5): 1398-404. https://doi.org/10.1016/j.jtcvs.2016.01.030
18. Miao L, Zhang Y, Hu H, Ma L, Shun Y, Xiang J, et al. Incidence and management of chylothorax after esophagectomy. Thorac Cancer 2015; 6(3): 354-8. https://doi.org/10.1111/1759-7714.12240
19. Varshney VK, Suman S, Garg PK, Soni SC, Khera PS. Management options for post-esophagectomy chylothorax. Surg Today 2021; 51(5): 678-85. https://doi.org/10.1007/s00595-020-02143-y
20. Williams KR, Burford TH. The management of chylothorax. Ann Surg 1964; 160(1): 131-40. https://doi.org/10.1097/00000658-196407000-00019
21. Pillay T, Singh B. A review of traumatic chylothorax. Injury 2016; 47(3): 545-50. https://doi.org/10.1016/j.injury.2015.12.015
22. Hou X, Fu JH, Wang X, Zhang LJ, Liu QW, Luo KJ, et al. Prophylactic thoracic duct ligation has unfavorable impact on overall survival in patients with resectable oesophageal cancer. Eur J Surg Oncol 2014; 40(12): 1756-62. https://doi.org/10.1016/j.ejso.2014.05.002
23. Merigliano S, Molena D, Ruol A, Zaninotto G, Cagol M, Scappin S, et al. Chylothorax complicating esophagectomy for cancer: A plea for early thoracic duct ligation. J Thorac Cardiovasc Surg 2000; 119(3): 453-7. https://doi.org/10.1016/S0022-5223(00)70123-1
24. Schurink B, Mazza E, Ruurda JP, Roeling TA, Steenhagen E, Bleys RL, et al. Low-fat tube feeding after esophagectomy is associated with a lower incidence of chylothorax. Ann Thorac Surg 2019; 108(1): 184-9. https://doi.org/10.1016/j.athoracsur.2019.02.056
25. Liu L, Gong L, Zhang M, Wu W. The effect of prophylactic thoracic duct ligation during esophagectomy on the incidence of chylothorax and survival of the patients: An updated review. Postgrad Med 2021; 133(3): 265-71. https://doi.org/10.1080/00325481.2020.1803666
26. Lei Y, Feng Y, Zeng B, Zhang X, Chen J, Zou J, et al. Effect of prophylactic thoracic duct ligation in reducing the incidence of postoperative chylothorax during esophagectomy: A systematic review and meta-analysis. Thorac Cardiovasc Surg 2018; 66(5): 370-5. https://doi.org/10.1055/s-0037-1602259
27. Li W, Dan G, Jiang J, Zhao Y, Deng D. A 2-wk conservative treatment regimen preceding thoracic duct ligation is effective and safe for treating post-esophagectomy chylothorax. J Surg Res 2013; 185(2): 784-9. https://doi.org/10.1016/j.jss.2013.07.012
28. Chang YC, Yen YT, Chang MC, Tseng YL. Localization of thoracic duct using heavily T2W MRI for intractable post-esophagectomy chylothorax-a case report. J Thorac Dis 2017; 9(2): 109-14. https://doi.org/10.21037/jtd.2017.02.37
29. Ohkura Y, Ueno M, Shindoh J, Iizuka T, Ka H, Udagawa H. Risk factors for postoperative chylothorax after radical subtotal esophagectomy. Ann Surg Oncol 2018; 25(9): 2739-46. https://doi.org/10.1245/s10434-018-6640-1
30. Misthos P, Kanakis MA, Lioulias AG. Chylothorax complicating thoracic surgery: Conservative or early surgical management? Updates Surg 2012; 64(1): 5-11. https://doi.org/10.1007/s13304-012-0133-8

31. *Liu J, Sato Y, Motoyama S, Ishiyama K, Yamada K, Yamamoto M, et al. Ultrasound-guided intranodal lipiodol lymphangiography from the groin is useful for assessment and treatment of post-esophagectomy chylothorax in three cases. Int J Surg Case Rep 2016; 29: 103-7. https://doi.org/10.1016/j.ijscr.2016.10.069*

32. *Yamamoto M, Miyata H, Yamasaki M, Maeda N, Miyazaki Y, Takahashi T, et al. Chylothorax after esophagectomy cured by intranodal lymphangiography: A case report. Anticancer Res 2015; 35(2): 891-5.*

33. *Guillem P, Billeret V, Lecomte Houcke M, Triboulet J. Successful management of post-esophagectomy chylothorax/chyloperitoneum by etilefrine. Dis Esophagus 1999; 12(2): 155-6. https://doi.org/10.1046/j.1442-2050.1999.00021.x*

34. *Yamagata Y, Saito K, Hirano K, Oya M. Laparoscopic transhiatal thoracic duct ligation for chylothorax after esophagectomy. Thorac Cardiovasc Surg 2019; 67(7): 606-9. https://doi.org/10.1055/s-0038-1677507*

35. *Lubbers M, van Det MJ, Kouwenhoven EA. Intraoperative Lipid-Rich Nutrition in the Detection of chylothorax in minimally invasive Ivor Lewis esophagectomy. Surg Innov 2019; 26(5): 545-50. https://doi.org/10.1177/1553350619852504*

36. *Dugue L, Sauvanet A, Farges O, Goharin A, Le Mee J, Belghiti J. Output of chyle as an indicator of treatment for chylothorax complicating oesophagectomy. Br J Surg 1998; 85(8): 1147-9. https://doi.org/10.1046/j.1365-2168.1998.00819.x*

37. *Rafiq S, Dar MA, Nazir I, Shaffi F, Shaheen F, Kuchay IA. Image-guided catheter drainage in loculated pleural space collections, effectiveness, and complications. Lung India 2020; 37(4): 316-22. https://doi.org/10.4103/lungindia.lungindia_385_19*

38. *Benedix F, Schulz HU, Scheidbach H, Lippert H, Meyer F. Successful conservative treatment of chylothorax following oesophagectomy-a clinical algorithm. S Afr J Surg 2010; 48(3): 86-8.*

39. *Selle J, Snyder 3rd W, Schreiber JT. Chylothorax: Indications for surgery. Ann Surg 1973; 177(2): 245-9. https://doi.org/10.1097/00000658-197302000-00022*

ORİJİNAL ÇALIŞMA-ÖZET
Turk J Surg 2022; 38 (4): 401-408

Ondokuz yıllık transhiatal özofajektomide şilotoraks ensidansı: Olgu serisi ve inceleme çalışması

Rahim Mahmodlou[1], Awat Yousefiazar[2]

[1] Urmiye Tıp Bilimleri Üniversitesi, Genel Cerrahi Anabilim Dalı, Urmiye, İran

[2] Urmiye Tıp Bilimleri Üniversitesi Birleşik Tıp Bilimleri Meslek Yüksek Okulu, Anestezi ve Cerrahi Teknoloji Anabilim Dalı, Urmiye, İran

ÖZET

Giriş ve Amaç: Şilotoraks (CTx), lenfatik sıvının plevral boşlukta sızması ve birikmesidir. CTx ensidansı özofajektomi sonrası en yüksek orana sahiptir. Bu çalışmanın amacı, özofajektomi sonrası şilotoraksın risk faktörleri, tanı ve yönetimi açısından gözden geçirildiği 19 yılda yapılan 612 özofajektomiden üç tanesini sunmayı amaçladık.

Gereç ve Yöntem: Çalışmaya 612 hasta dahil edildi. Tüm hastalara transhiatal özofajektomi uygulandı. Üç olguda şilotoraks saptandı. Her üç olguda da şilotoraksın yönetimi için sekonder cerrahi uygulandı. Sağ taraftan kaçak olan birinci ve üçüncü olgulara kütle ligasyonu uygulandı. İkinci olguda, sızıntı belirgin bir kanal olmadan sol taraftandı ve birkaç kez yapılan kütle ligasyonuna rağmen şilde önemli bir azalma gözlenmedi.

Bulgular: İlk olguda, sızıntı azalmasına rağmen, hasta yavaş yavaş solunum sıkıntısına ilerledi. Hastanın durumu zamanla kötüleşti ve üç gün sonra hasta kaybedildi. Üçüncü ameliyat gerektiren ikinci olguda ise hastanın durumu kötüleşti ve iki gün sonra solunum yetersizliği nedeniyle hayatını kaybetti. Üçüncü hastada ameliyat sonrası iyileşme görüldü. Hasta ikinci ameliyatının ardından beşinci günde taburcu edildi.

Sonuç: Özofajektomi sonrası şilotoraksta, yüksek mortalite oranlarını önlemenin anahtarı, risk faktörlerinin yanı sıra semptomların zamanında saptanması ve uygun yönetimi olabilir. Ayrıca şilotoraksın erken komplikasyonlarını önlemek için erken cerrahi müdahale düşünülmelidir.

Anahtar Kelimeler: Şilotoraks, transhiatal özofajektomi, post-özofajektomi şilotoraks

DOİ: 10.47717/turkjsurg.2022.5821