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# Surgical intervention in a complicated persistent chyle leak

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ABSTRACT

*INTRODUCTION:* Chyle leak following cervical surgery has a reported incidence of around 2% annually, and the injury primarily favors a left sided involvement. Our patient presented with a right sided neck persistent chyle leak status post cervical neck dissection and radiation therapy. Infection complicated the patient's clinical course, and he inevitably required a right sided VATS thoracic duct ligation.

*PRESENTATION OF CASE:* The patient was a 53-year-old African American male, with a past medical history of T1N0 right tonsil carcinoma status post chemo-radiation in 2016. He was found to have a residual right-sided neck mass, and then underwent a total neck dissection of the mass and the involved lymph node levels.

*DISCUSSION:* Our patient presented with a right sided lymphatic injury following a total cervical neck dissection. His presentation was uncharacteristic for that the chyle leak was on the right side of his neck, and that he subsequently developed cellulitis and bacteremia due to a prolonged period to surgical intervention. His refractory response to initial conservative measures could have been affected by his prior radiation treatment.

*CONCLUSION:* Chyle leakage is a rare complication of total cervical neck dissection, and should always be considered even with right sided involvement. Conservative management is appropriate in the initial presentation; however, if a patient has a prior history of radiation treatment to the involved site, thoracic duct ligation implemented early may prevent complications such as infection, or a prolonged hospital stay.

The following case report has been reported in line with the SCARE criteria.



## 1. Introduction

This case report is of clinical significance given the relative infrequency of lymph vessel injuries following cervical surgery; which is reported annually around 2% [2], the even smaller incidence of right sided neck involvement, the prior history of radiation therapy, and lastly the occurrence of infection within the affected site.

The patient presented with a right sided lymph vessel injury within the neck, following a total neck dissection for a removal of a mass. Initial conservative measures to address the chyle leak were unsuccessful, and the patient ultimately required a right sided video assisted thoracoscopic thoracic duct ligation.

The following patient was managed in an academic hospital. He was admitted under the care of the surgical oncology service, and inevitably needed the assistance of the cardiothoracic surgical team.

## 2. Presentation of case

The patient was a 53-year-old African American male who had presented on 04/05 to an outside affiliate hospital's ED. His chief complaints upon arrival were increased right-sided neck erythema and edema. He is recently status post total neck dissection of mass with multiple lymph node biopsies on the 3/10. He had a size 15 Blackmore JP drain in place, within the former neck incision, with ongoing serous-milky drainage since the operation. During the presentation, the fluid in the canister appeared cloudy/milky in quality measuring at 50 cc. He verbalized having to empty the drain's collection bulb/canister three times per day. Of note, he had no other pertinent surgical, medical, nor family history. He was only taking amlodipine for HTN.

The patient was then transferred to our facility for direct admission to the Head and Neck Surgical Oncology service; this was the same surgical service who had performed the neck dissection and lymph node biopsy. Of note, the patient's JP drain had dislodged at the outside hospital while he was in route to our facility. At our hospital he denied fever, night sweats, dyspnea, nausea, vomiting, and diarrhea. Positive exam findings were limited to right-sided neck erythema and edema, and the milky/cloudy drainage coming

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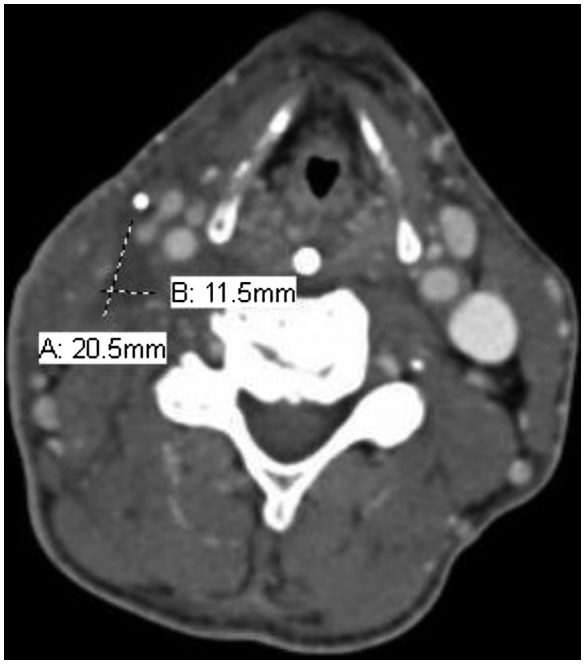


**Fig. 1.** CT of head and neck.
(Radiologist's impression: 1. Surgical drain present in the right inferolateral neck surrounded by inflammation/edema without localized fluid collection surrounding the drain. 2. Irregularly marginated fluid collection superiorly adjacent to the surgical drain as described. 3. Segmental occlusion of the caudal aspect of the right internal jugular vein as described.)

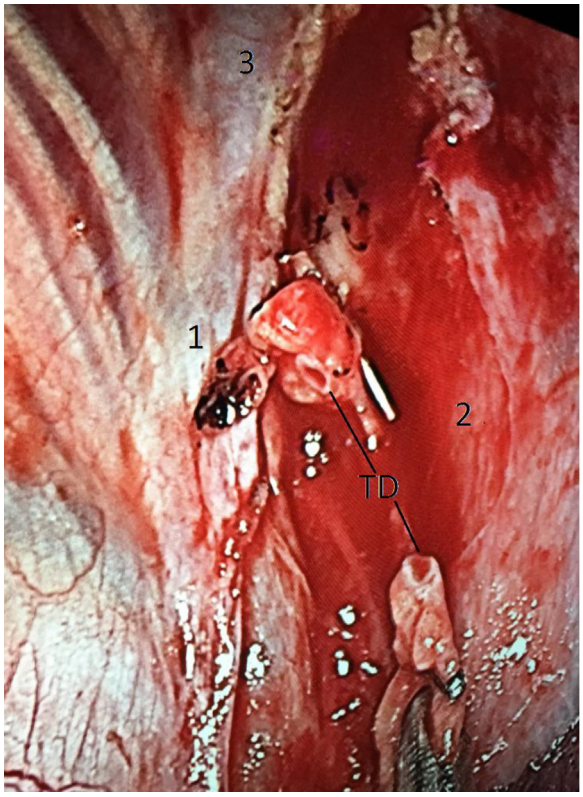


**Fig. 2.** Pictured is the transected and ligated thoracic duct. Anatomical landmarks are numbered as follows: 1-azygous vein, 2-esophagus, 3-spine, TD-thoracic duct.

from the drain site. Laboratory findings were normal except for an elevated serum creatinine of 1.21.

Per the Surgical Oncology service, the patient was started on a nonfat diet and prescribed octreotide. He was then observed for the next 3–4 days with only a moderate decrease in drainage; output had remained at 400 cc/24 h. Subsequently, he was scheduled for surgical re-exploration and control of the leak. During the procedure the patient was given cream intraoperatively, via an oropharyngeal tube to help visualize the source of the chyle leak. There was a scant amount of drainage noted originating from a small lymphatic vessel in the neck. The vessel was then ligated, and another JP drain inserted and placed on suction. During the next two days post-operation there was a continued output of chyle: measuring 375 cc on post-op day 1, and 300 cc of frank chyle output on post-op day 2. This prompted the surgical oncology service to consult the Cardiothoracic Surgery department.

The Cardiothoracic Surgical team assessed the patient the day of consultation. Due to the slight trend of decreasing chyle output, a decision was made between the consultants and the primary team to continue monitoring for further declining output. Conservative medical therapy consisting of Octreotide 100 mcg q8 h, a nonfat diet, and Orlistat 120 mg TID with meals was continued during this time. Over the next few days, the JP drain chyle output decreased moderately to a persistent 200 cc/24 h. The decision was then made for surgical ligation of the thoracic duct; the patient was scheduled for the operation on 04/21.

The day prior to surgery the patient's status had changed: he was found to be febrile with a temp of 103° Fahrenheit, experiencing chills, and had a white blood cell count of 21,000. Surgery was thus postponed, and the patient was later treated for right neck cellulitis. Initial management consisted of drawing blood cultures, empiric antibiotic treatment with Vancomycin and piperacillin/tazobactam, and a CT scan of the neck. The CT scan illustrated a 1.1 × 2 cm right neck fluid collection with short segment partial occlusion of right IJ (Fig. 1). The infectious disease department was consulted for management. The patient underwent percutaneous drainage of the right neck via interventional radiology on 04/22. By 04/24, the blood cultures had returned and illustrated methicillin sensitive s. aureus. Infectious disease then discontinued the vancomycin and piperacillin/tazobactam, and ordered cefazolin for directed therapy.

By 04/27, the patient was afebrile, had two negative blood cultures, and thus was cleared for surgery. The patient underwent a right-sided video-assisted thoracoscopic surgery (V.A.T.S.) with thoracic duct ligation, performed by our Cardiothoracic Surgeon. Four clips were applied on either side of the thoracic duct, and then it was transected between the applied clips (See Fig. 2). Meticulous hemostasis was established prior to exiting and closing the thoracic cavity. A size 28-French Blake chest tube was positioned in the right costophrenic angle with the tail exiting the right thoracic cavityOn post-operative day 1 the patient's chief complaint was moderate postoperative chest pain. This was managed by PO NSAIDs with patient-reported relief. The JP drainage decreased following the procedure to a recorded 45 cc during the first 24 h. The following day, the patient continued to make progress with zero JP drainage and no chest tube output. On postoperative day 3 again there was no output, and appropriately the chest tube was removed. On postoperative day 4 octreotide and orlistat were discontinued. During this time fluid collection within the JP drain remained zero. CT surgery then signed off on postoperative day 6, but follow up in one month as an outpatient in the clinic. The JP drain was removed by the primary team, the surgical oncology team, prior to hospital discharge. During the follow-up appointment on 5/22 the patient had no chief complaints. The patient reported an increase in energy, and the ability to enjoy a regular diet again. The physical exam was benign, and no further follow-up appointment was scheduled.

## 3. Discussion

Our patient presented with a right sided lymphatic injury following a total cervical neck dissection. His presentation was uncharacteristic for that the chyle leak was on the right side of his neck, he had prior radiotherapy, and that he subsequently developed cellulitis and bacteremia due to a prolonged period to surgical intervention.

As mentioned previously, chyle leak due to lymph vessel injury during neck surgery has a 2% incidence, and of the 2% only one fourth occur on the right side of the neck [3]. This rare presentation can contribute to a difficult diagnosis if the provider is not careful. Fortunately, with the visualization of the draining fluid a diagnosis of chyle leak can be easily made by the appearance of a "milk" quality or white color [3].

The lack in decreasing chyle production for the patient prior to his admission may have been a result of his prior radiation treatment. Prior to the total neck dissection, the patient underwent neoadjuvant radiation to the involved site. Radiation, although a beneficial treatment modality for decreasing the size of oncological masses is not without its side effects. Furthermore, there is a lot of research documenting impaired wound healing following radiation treatment [4], and research showing an increased rate of complications from neck dissection following radiotherapy [5].

The course of treatment and the patient's subsequent response advocate for a possible earlier role of surgery in individuals with prior radiation therapy who present with persistent chyle leak. In fact, if the VATS procedure was performed earlier the resulting neck infection may not have occurred. Yet, with the delay of surgery the patient's cellulitis progressed to bacteremia resulting in a prolonged hospital course. The complication of the infection most likely added to financial cost, patient anxiety, and length of hospital stay.

Lastly, recent publications on chyle leakage report that if no improvement is seen within 3 days from the initiation of treatment it is unlikely that there will be a favorable response [6]. VATS thoracic duct ligations have a reported success rate of greater than 90% with ligation proximal to the diaphragm [7]. In our patient the thoracic duct ligation was approached via the right chest, and under thoracoscopic guidance for ease of visualization. This operation was the only therapeutic modality that illustrated a measurable and patient-reported improvement.

## 4. Conclusion

Chyle leakage is a rare but a known complication of total cervical neck dissection through the anterior plane. Since a persistent chyle leak has a high morbidity, related to nutritional depletion and immunosuppression, a curative intervention should be implemented early if possible. Conservative management is appropriate in the initial setting; however, if a patient has a prior history of radiation treatment to the involved site, VATS thoracic duct ligation implemented early may prevent complications such as infection. In our case report, our patient required surgical ligation of the thoracic duct to prevent his persistent chyle loss because focal control within the neck, nor medical therapy were successful.

## Conflicts of interest

There are no conflicts of interest.

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## Ethical approval

The hospital's institutional review board's approval has been given. The reference number is IRB file # 08-17-18 EX.

## Consent

The patient consent has been given.

## Author contribution

Bradley Tenny- Primary author.
Jeko Madjarov- Co-Author (Interpretation and writing).
Travis Shipe- Co-author (Interpretation and Analysis).

## Registration of research studies

Case Report.

## Guarantor

Jeko Madjarov MD.

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