




# Novel Use of Obsidio Conformable Embolic in Thoracic Duct Embolization

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## Abstract

Chylothorax is a potentially serious condition resulting from thoracic duct injury. When chyle output remains high despite medical management, invasive interventions such as surgical ligation or percutaneous thoracic duct embolization (TDE) may be necessary. Obsidio is a novel conformable embolic agent that shares properties of both coil and liquid embolic agents. A 37-year-old man presented with left-sided chylothorax, refractory to medical management, following a high-speed motorcycle collision. The thoracic duct was successfully embolized using Obsidio placed between coil packs with fibered coils. This case report demonstrates the first successful use of Obsidio for TDE in a patient with traumatic chylothorax.

## Keywords

- ▶ thoracic duct embolization
- ▶ Obsidio
- ▶ chylothorax

## Introduction

Chylothorax, the accumulation of lymph fluid (chyle) within the pleural space, is a potentially serious condition resulting from thoracic duct injury. The most common etiologies of chylothorax are thoracic surgery, noniatrogenic trauma, and malignancy.<sup>1</sup> Medical management includes diet modifications, chest tube drainage, and medications to reduce chyle production. However, when chyle output remains high (>1,000 mL/d) despite medical management, invasive interventions such as surgical ligation or percutaneous thoracic duct embolization (TDE) may be necessary.<sup>2,3</sup>

TDE is a minimally invasive procedure performed under moderate sedation. Lymphangiogram is performed to localize the cisterna chyli to cannulate the thoracic duct. While various embolic agents exist (e.g., coils, liquid glues, conformable materials), each presents advantages and limitations. Overall success rate is highest when using a combination of coils and liquid embolic agents.<sup>4</sup> Obsidio is a novel conformable embolic agent, currently approved for embolizing hypervascular tumors and controlling peripheral bleeding, which shares properties of both coil and liquid

embolic agents.<sup>5</sup> Its unique properties and potential role in TDE warrant further investigation. To our knowledge, we present the first case of successful TDE for chylothorax using Obsidio.

## Case Report

A 37-year-old man presented to the trauma unit following a high-speed motorcycle collision. He sustained significant polytrauma, requiring emergent interventions including resuscitative endovascular balloon occlusion of the aorta, splenectomy, pelvic fixation, and spinal fusion. On hospital day 47, the patient developed a left pleural effusion initially presumed to be residual hemothorax (▶ **Fig. 1**). The fluid was surgically drained and presumed to be infectious. However, despite antibiotic therapy, the chest tube output persisted. Further investigation revealed high pleural fluid triglyceride levels (397 mg/dL), confirming a chylothorax.

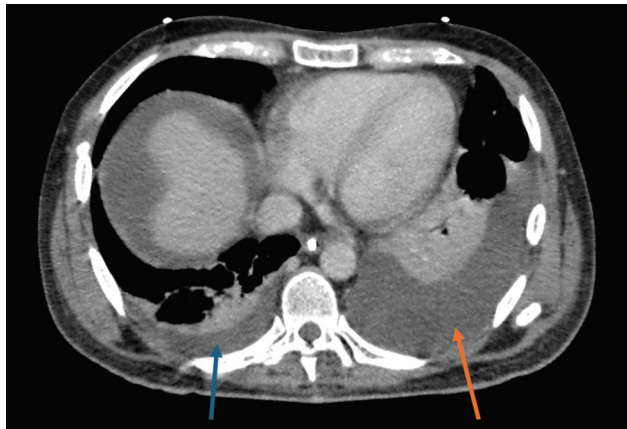
Interventional radiology (IR) was consulted. Lymphangiography demonstrated an active thoracic duct leak at the T10–T11 level (▶ **Fig. 2A**). TDE was performed via a retrograde approach from the left jugulovenous angle. The

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**Fig. 1** Axial chest computed tomography (CT) demonstrating a large left-sided pleural effusion (orange arrow) and a smaller right-sided effusion (blue arrow). The absence of peripheral enhancement suggests a noninfectious process.

thoracic duct was successfully embolized using 0.6 mL of Obsidio embolic placed between coil packs (sandwich technique) with Embold fibered coils (→Fig. 2B, C). Postembolization computed tomography (CT) and fluoroscopic images show complete embolization of the thoracic duct. Although the patient's recovery was prolonged due to other complications, he was eventually discharged with no recurrence of the chylothorax.

## Discussion

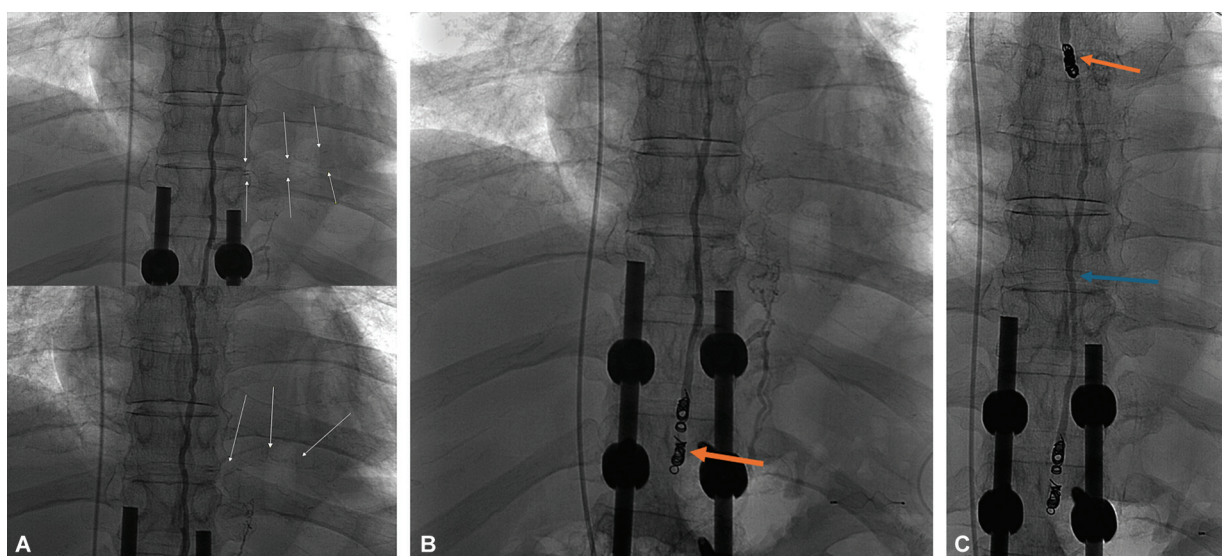
Traumatic thoracic duct injuries leading to chylothorax pose a significant clinical challenge. High-output chylothorax, refractory to medical management, typically requires procedural intervention. TDE is a minimally inva-

sive alternative to surgery, with high success rates.<sup>4,6</sup> Liquid embolization, preceded by coil placement as scaffolding, is the current standard of care. However, liquid embolic agents such as glue have inherent limitations, including the risk of nontarget embolization, catheter adhesion, and tissue extravasation.<sup>7,8</sup>

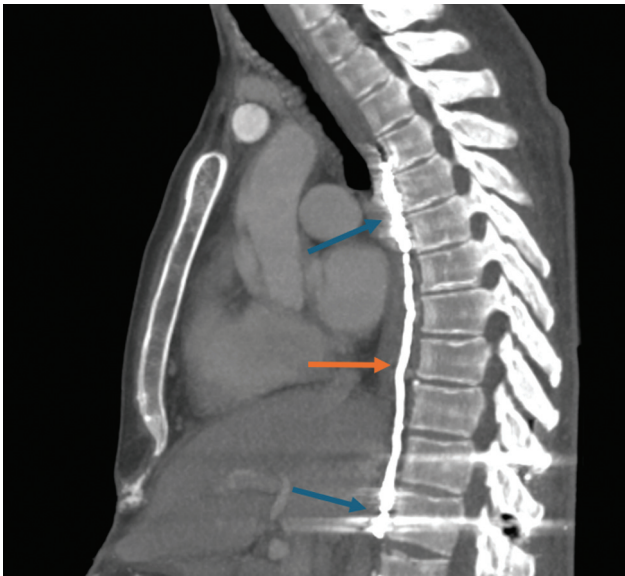
This case report demonstrates the successful use of Obsidio, a novel conformable embolic, for TDE in a patient with traumatic chylothorax. Obsidio's unique properties address some of the challenges associated with liquid embolic agents. Its ease of preparation, rapid hemostasis, and lack of catheter adhesion streamline the procedure. Additionally, shear-thinning technology allows for controlled delivery and precise embolization. Obsidio transitions from a semi-solid state to the liquid state when pressure is applied during microcatheter injection, facilitating smooth flow and precise placement. Upon removal of the force, Obsidio quickly returns to its semi-solid form, preventing unwanted migration.

While Obsidio cannot be repositioned after deployment like micro-coils, its conformable nature often eliminates the need for supplementary coiling techniques ("sandwich technique").<sup>5</sup> In this case, the proximal and distal coil packs were likely unnecessary, but were used in this initial case for scaffolding due to the novelty of the technique. Furthermore, Obsidio's radiopacity and reduced streak artifact on follow-up imaging provide advantages over coils (→Fig. 3).

The success of Obsidio embolization in this case might be attributed to the gelatin component and its arginylglycylaspartic acid (RGD) peptides. RGD-integrin binding likely enhances adhesion to the lymphatic endothelium, promoting targeted occlusion. This adhesion could stabilize the embolic material within the lymphatic vessel for targeted and efficient occlusion. The interaction between the RGD



**Fig. 2** (A) Lymphangiogram (frontal view) revealing a subtle contrast leak from the distal thoracic duct (white arrows), confirming the source of the chylothorax. (B) Fluoroscopic image during thoracic duct embolization (TDE) demonstrating placement of Embold fibered coils within the distal thoracic duct (orange arrow). Coils are used to create an initial framework for embolization. (C) Fluoroscopic image during TDE showing subsequent placement of Obsidio embolic (blue arrow) and additional Embold fibered coils in the proximal thoracic duct (orange arrow). Note the radiopaque nature of Obsidio.



**Fig. 3** Maximum intensity projection (MIP) reconstruction from a computed tomography (CT) scan. The Obsidio embolic (orange) demonstrates significantly less streak artifact compared with the proximal and distal coil packs (blue), allowing for better visualization of surrounding structures.

sequence and integrins could potentially augment the thrombogenic response initiated by gelatin, leading to a more robust and localized clot formation. Additionally, RGD-integrin binding can influence cellular processes like proliferation and apoptosis. These effects could further enhance the occlusive process by altering the behavior of endothelial cells in response to the embolic material.<sup>6</sup>

## Conclusion

While this case demonstrated a positive outcome, further studies are needed to establish Obsidio's safety profile, complication rates, and long-term success in TDE compared with current standards. Its current Food and Drug Administration (FDA) approval for peripheral vascular embolization

highlights the potential for expanded applications. Expanding the use of Obsidio in TDE for chylothorax could be a valuable new tool and potentially improve patient outcomes.

## Funding

None.

## Conflict of Interest

None declared.

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