Scientific Research Publishing

Open Journal of Obstetrics and Gynecology, 2025, 15(11), 1857-1863
https://www.scirp.org/journal/ojog
ISSN Online: 2160-8806
ISSN Print: 2160-8792

Successful Control of Intractable Lymphatic Ascites after Pelvic Lymphadenectomy for Cervical Cancer Using Cell-Free and Concentrated Ascites Reinfusion Therapy (CART): A Case Report

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How to cite this paper: Takeuchi, K., Shirakuni, A., Kano, M., Yoshida, A., Yamasaki, Y., Sugimoto, M. and Shimizu, K. (2025) Successful Control of Intractable Lymphatic Ascites after Pelvic Lymphadenectomy for Cervical Cancer Using Cell-Free and Concentrated Ascites Reinfusion Therapy (CART): A Case Report. *Open Journal of Obstetrics and Gynecology*, **15**, 1857-1863.
https://doi.org/10.4236/ojog.2025.1511154

Received: October 10, 2025
Accepted: November 2, 2025
Published: November 5, 2025

Abstract

Lymphatic leakage following systematic lymphadenectomy is an uncommon but potentially severe complication in gynecologic surgery. Intractable lymphatic ascites can persist for several months and be refractory to conservative therapies. Cell-free and concentrated ascites reinfusion therapy (CART) has been utilized primarily in patients with malignancy-associated ascites to improve symptoms and nutritional status. We report a case of intractable lymphatic ascites after pelvic lymphadenectomy for stage IB2 cervical squamous cell carcinoma that was successfully managed with CART. A 52-year-old woman underwent radical hysterectomy and pelvic lymphadenectomy. She developed progressive ascites without evidence of malignancy or chylous leakage. Despite conservative measures, including paracentesis (2000 mL on POD 42), albumin infusion, and a 4-day course of octreotide, ascites persisted. CART was performed on postoperative days 51 and 85, resulting in gradual resolution of ascites by day 118. This case highlights the potential utility of CART in managing refractory lymphatic ascites after gynecologic oncologic surgery.

Keywords

Cell-Free and Concentrated Ascites Reinfusion Therapy (CART), Lymphatic Ascites, Pelvic Lymphadenectomy

1. Introduction

Lymphatic leakage is a rare but recognized complication following systematic pelvic and para-aortic lymphadenectomy in gynecologic malignancies. Although frequently self-limited and asymptomatic, massive lymphatic ascites may develop in some patients, leading to abdominal distension, nutritional depletion, and delayed postoperative recovery [1]. Conservative approaches such as paracentesis and pharmacologic agents are generally first-line treatments. However, in cases refractory to these interventions, alternative modalities may be required. Cell-free and concentrated ascites reinfusion therapy (CART) is a form of extracorporeal therapy where ascitic fluid is filtered and concentrated to remove cellular components and reinfused into the patient [2]. It has shown effectiveness in malignancy-related or liver cirrhosis-associated ascites but no cases have been reported in the management of postoperative lymphatic leakage. Herein, we present a case where CART proved effective in resolving lymphatic ascites after radical surgery for cervical cancer.

2. Case Report

A 52-year-old gravida 2, para 2 woman presented with abnormal genital bleeding and was diagnosed with stage IB1 cervical squamous cell carcinoma, FIGO 2018. She was referred to our institution for further management. Tumor markers including CA125, SCC, and CEA were within normal limits. Preoperative imaging suggested vaginal wall invasion, and she underwent radical hysterectomy with bilateral pelvic lymphadenectomy up to the common iliac nodes. No ascites was observed intraoperatively. Postoperative pathological examination revealed a tumor size greater than 4 cm, without vaginal wall invasion or lymph node metastasis (34 nodes dissected), which corresponds to Stage IB3 according to FIGO 2018.

Postoperative recovery was initially uneventful. However, by postoperative day (POD) 4, moderate ascites was noted. Abdominal distension progressively worsened, and CT imaging on POD 11 (**Figure 1**) revealed massive ascitic accumulation. Serum CA125 was markedly elevated to 480 U/mL by POD 35. Urinary tract imaging (**Figure 2**) showed no signs of urinary leakage. Diagnostic paracentesis yielded clear, straw -colored, non-chylous fluid with negative cytology and Rivalta reaction. Triglyceride and protein concentrations were 11 mg/dL and 2.6 g/dL, respectively.

From POD 22, concurrent chemoradiotherapy (CCRT) was initiated. Despite paracentesis (2000 mL on POD 42), albumin infusion, and a 4-day course of octreotide, ascites persisted. The patient's serum albumin declined to 2.8 g/dL, accompanied by generalized edema. Given the refractory nature of ascites and deteriorating nutritional status, CART was initiated on POD 51 (3350 mL of ascitic fluid). Partial improvement followed, and a second CART session was performed on POD 85 (1845 mL drained). Subsequently, ascites diminished progressively

and was undetectable by POD 118. Serum CA125, which was considered to be elevated due to peritoneal irritation caused by massive ascites accumulation, decreased in parallel and normalized by POD 148 (Figure 3).

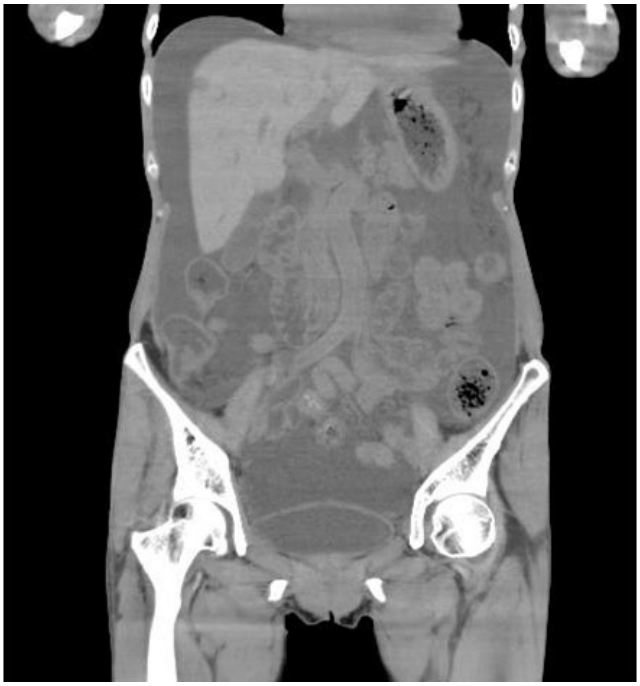

Figure 1. Computed tomography (CT).

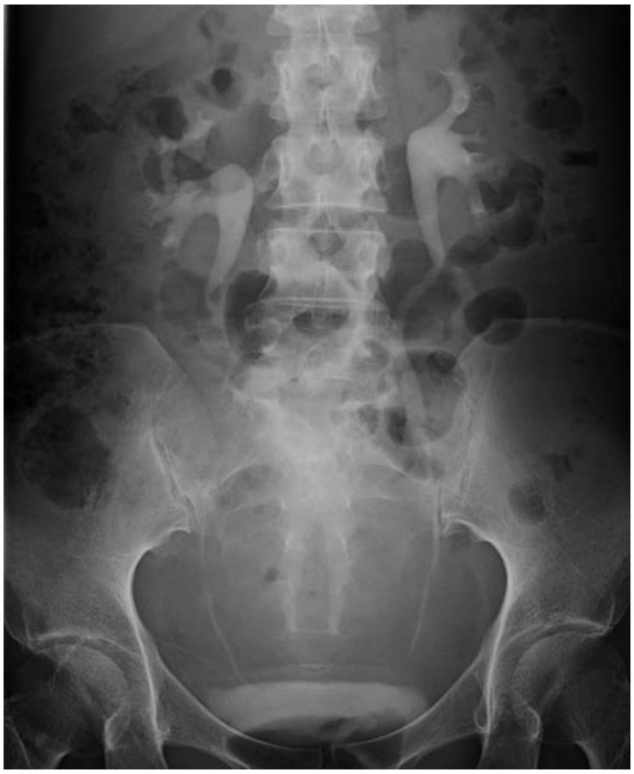

Figure 2. Intravenous urography.

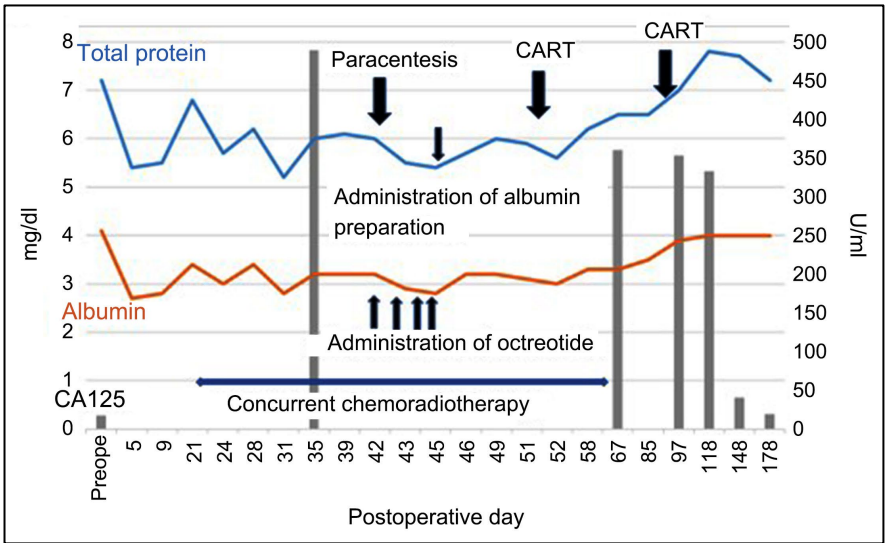

Figure 3. Clinical course.

3. Discussion

Lymphatic ascites following pelvic lymphadenectomy arises from disruption of lymphatic vessels, leading to leakage of lymph fluid into the peritoneal cavity. Although rare after cervical cancer surgery, especially when confined to the pelvic nodes, it may develop in select patients due to surgical trauma, extensive nodal dissection, or impaired lymphatic healing exacerbated by adjuvant therapies such as radiotherapy. In this case, the absence of urinary tract injury and the ascitic profile supported a diagnosis of serous lymphatic leakage.

Lymphatic leakage typically resolves spontaneously within 2 - 3 weeks, though some cases persist for several months. The incidence is reported to be between 1.8% and 4% in gynecologic surgery [3]-[5]. Risk factors include the number of dissected lymph nodes, nodal metastases, and adjuvant treatments that may delay tissue repair or lymphatic regeneration [6].

When conservative therapy fails, repeated paracentesis may provide symptom relief but carries risks of infection, visceral injury, and hypoalbuminemia. Hong *et al.* [7] described spontaneous resolution of lymphatic ascites after 52 days of serial paracenteses, while other reports detail cases resolving over a year with supportive care [8]. More interventional strategies, such as lymphangiography using Lipiodol, have shown promise by inducing inflammation and fibrosis at leakage sites [9]. However, its efficacy depends on precise localization of the leakage site, and the procedure requires interventional expertise, with rare complications such as fever, infection, and systemic oil embolism. In contrast, CART is a minimally invasive supportive therapy in which ascitic fluid is filtered, concentrated, and reinfused intravenously, effectively relieving symptoms and maintaining serum protein levels without the need for lymphatic access. In the present case, the initial use of albumin and octreotide yielded insufficient results. Octreotide, a somatostatin analogue, has been reported to reduce lymph production in chylous ascites

[10], but its efficacy in serous lymphatic ascites is less established. Given the patient's ongoing symptoms, poor nutritional status, and need to complete CCRT, CART was introduced.

CART allowed removal of large volumes of ascites while preserving protein-rich fluid for reinfusion, thereby stabilizing intravascular volume and improving albumin levels [2]. This dual mechanism may have helped reduce pressure on peritoneal structures and promote lymphatic healing. Additionally, CART may modulate local inflammation by filtering pro-inflammatory cytokines, further contributing to resolution. Finally, it is important to emphasize what CART is not—it is not a focal sealing procedure and does not directly occlude or embolize leaking lymphatic channels. Therapeutic modalities such as Lipiodol lymphangiography (with or without directed embolization) act by visualizing the leak and inducing a local inflammatory/occlusive effect that can physically seal small lymphatic defects. By contrast, CART is best conceptualized as an effective supportive strategy that treats the physiologic consequences of ascites (volume overload, hypoproteinemia, malnutrition, abdominal hypertension) and thereby creates conditions under which spontaneous lymphatic closure is more likely to occur or other definitive interventions can be safely pursued. When definitive anatomical repair is required (for example, when a discrete leak is localized and amenable to embolization), lymphangiographic techniques remain the preferred targeted therapy.

Although the temporal correlation with CCRT completion may suggest natural recovery, the repeated CART sessions corresponded with measurable clinical improvement, supporting its potential role in managing intractable postoperative lymphatic ascites. The evidence suggests that CART primarily provides symptomatic relief and nutritional/hemodynamic stabilization while simultaneously producing secondary favorable conditions (reduced intra-abdominal pressure, less peritoneal irritation, restored oncotic pressure) that may accelerate or permit spontaneous lymphatic healing. To refine this conceptual model, prospective studies should 1) incorporate objective pre- and post-CART measures of intra-abdominal pressure, peritoneal and systemic inflammatory biomarkers, and lymphatic imaging when feasible; 2) compare timing strategies (early CART as bridge vs. delayed CART after other measures fail); and 3) evaluate combined protocols in which CART is paired sequentially with diagnostic/therapeutic lymphangiography in patients who remain symptomatic or in whom leaks are localized. Such data would clarify whether CART should be considered primarily palliative/bridging or whether it can be expected to actively promote lymphatic repair in a meaningful proportion of cases.

4. Conclusion

Pelvic lymphatic leakage following gynecologic cancer surgery is usually self-limiting, but in rare cases may become refractory to standard treatment. CART represents a viable therapeutic option in patients with intractable lymphatic ascites unresponsive to conservative management. Further studies are warranted to de-

fine its role and timing in the postoperative management algorithm.

Availability of Data and Materials

The data are contained within this article.

Author Contributions

KT—Data curation; Formal analysis; Original draft writing. AS—Data curation; Formal analysis. MK, AY, YY, MS, KS—Review & Editing.

Ethics Approval and Consent to Participate

All clinical information and images used in this paper were approved by the ethical committee of Kobe Medical Center. The patient gave her written informed consent to publish her case.

Conflicts of Interest

The authors declare no conflict of interest.

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Abbreviations

CART, Cell-free and concentrated ascites reinfusion therapy;
CCRT, Concurrent chemoradiotherapy.