Successful lymphatic embolization using N-butyl-2-cyanoacrylate for postoperative lymphorrhea in a patient with renal pelvic cancer✩,✩✩

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ABSTRACT

We present a successful case of percutaneous lymphatic embolization using N-butyl-2-cyanoacrylate (NBCA) for postoperative lymphorrhea in a patient with urothelial carcinoma of renal pelvis. A 75-year-old man with urothelial carcinoma of left renal pelvis with para-aortic lymph nodes metastases. The patient presented severe lymphorrhea after neo-adjuvant chemotherapy followed by laparoscopic total left nephroureterectomy and lymph nodes dissection. Since conservative treatments were ineffective, percutaneous lymphatic embolization using NBCA resulted in healing of the lymphorrhea without recurrence. Percutaneous lymphatic embolization using NBCA followed by intranodal lymphography is a powerful treatment option for intractable postoperative lymphorrhea after lymph nodes dissection.

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✩ Keynote message: Percutaneous lymphatic embolization using N-butyl-2-cyanoacrylate is a powerful treatment option for postoperative lymphorrhea after node dissection.

✩✩ Competing interests: Nothing to declare.

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Introduction

Lymphorrhea is a leak of serous or yellow-colored and iso-osmotic abdominal fluid from disrupted lymphatic system [1]. Lymphorrhea is a rare adverse event after urological surgery, however it sometimes induces severe undernutrition and immune suppression. The first option of postoperative lymphorrhea is cessation of oral intake. In addition, somatostatin analogues are used in cases that are resistant to cessation of oral intake [2]. Here, we report a case of successful intranodal lymphography and percutaneous lymphatic embolization using N-butyl-2-cyanoacrylate (NBCA) diluted to 33% with ethiodized oil (Lipiodol; Guerbet, Villepinte, France) for intractable lymphorrhea after left total nephroureterectomy with para-aortic lymph nodes dissection.

Case presentation

A 75-year-old man was referred to our department with macrohematuria. Urinary cytology indicated high grade urothelial carcinoma and abdominal CT revealed a left renal pelvis tumor with multiple swelling of para-aortic lymph nodes. Consistent with the abdominal CT, retrograde pyelography showed a defect in left renal pelvis. Then we diagnosed as invasive urothelial carcinoma of renal pelvis with lymph nodes metastases. The size of para-aortic lymph node significantly decreased by 3 cycles of gemcitabine and cisplatin chemotherapy. Then, he underwent laparoscopic left total nephroureterectomy and para-aortic lymph nodes dissection. The lymph nodes were removed from the level of left renal artery to the inferior mesenteric artery using a vessel sealing system (LigaSure, Medtronic, Tokyo, Japan). The surgery required 5 hours and 19 minutes. The pathological diagnosis was high-grade invasive urothelial carcinoma.

After restarting oral intake on the second day after surgery, lymphorrhea was observed. Since the volume of lymphorrhea were not reduced by nil per os (NPO) for 7 days, somatostatin analogues were administrated 10 days after surgery. However, the volume of leakage was significantly increased over 1500 ml / day and CT identified fluid collection with floating fat in the retroperitoneal cavity with 150 mm in diameter 16 days after surgery (Figs. 1A and 2). Then we performed intranodal lymphography from both inguinal lymph nodes using ethiodized oil (Lipiodol; Guerbet, Villepinte, France) 17 days after surgery which identified lymphorrhea at 4th and 5th lumber vertebra (Figs. 1B and 2).

As the volume of lymphorrhea did not decrease following lymphography, we obtained written informed consent, then, a percutaneous lymphatic embolization using NBCA was performed on the 31st day after surgery. Since the accumulation of iodized oil in the upstream nodes closest to the lymphorrhea was demonstrated on the CT scan, the direct puncture of these nodes was performed by using isocenter puncture technique under fluoroscopy (Fig. 1C). After we injected some ethiodized oil to visualize lymphorrhea, the embolization was subsequently performed using NBCA diluted to 33% with iodized oil. Immediately after the embolization, lymphorrhea successfully resolved (Fig. 1D). During this period, we performed drain flushing and replacement for the infection control. At present, the lymphorrhea does not relapse without any adverse event for 9 months.

Discussion

A cross reference of [N-butyl-2-cyanoacrylate] and [lymphatic] was used to select original articles of unduplicated cases focusing on lymphatic embolization in human clinical subject.
using PubMed, resulting in 75 cases from 15 reports (Table 1). According to these reports, the median age of patients is 56 years old (range 37-86). The leak point was detected by ultrasound-guided intranodal lymphography in most cases, which included the lumbar region (85%), thoracic region (13%), and femoral region (2%). Although no report described adverse event, thoracic duct embolization were reported to include asymptomatic embolization of the pulmonary artery, legs edema [3], and chronic diarrhea as rare complications [4]. Based on 3 reports with a median observation period of 4 months (3-11 months), the success rate of this procedure was 86% (range 80-92). These data indicate that the procedure is feasible and useful.

There is a few reports about postoperative lymphorrhoea in urological surgeries, including nephrectomy and para-aorta lymph node dissection treatment for testicular carcinoma [5,6]. Conservative therapies, such as oral intake cessation and the administration of somatostatin analogues are standard
therapies for lymphorrhea that improves in approximately 60%-70% [7].

Surgical interventions, that include the ligation of the disrupted lymph channel and spaying fibrin glue are performed for the cases resistant for conservative therapies. However it is difficult to identify the appropriate ligation points [8]. Furthermore, the patients with suppressed immune system are high risk for surgical intervention.

On the other hand, lymphography has been shed light on because of more effective and less invasive for the detection and treatment of lymphorrhea [9–11]. Lipiodol used in lymphography is feasible for detection the site of lymphorrhea as well as treating the leakage site by inflammatory reaction. However, the success rate of lipiodol lymphography for postoperative lymphorrhea is only 50% [12]. In the case of refractory lymphorrhea, it is essential to increase the resistance of the leaking space or to decrease the outflow from the lymph duct. Since oral or enteral nutrition may increase lymph flow, cessation of oral intake would be effective for lymph flow reduction [13]. The cyclic peptide hormone somatostatin widely exists and influences in central nerve system, pancreas, and gastrointestinal tract [14,15]. Although the mechanism of decreasing lymph flow by somatostatin is not fully elucidated, one hypothesis is that somatostatin may reduce triglyceride absorption from the intestine and inhibit lymphatic flow after traversing the liver in the presence of the vagus nerve [16,17]. The method of inducing inflammation by injecting ethanol into the leaking space (sclerotherapy) is an attempt to heal the lymphorrhea by increasing the resistance to the destination of the lymphatic outflow. Low-pressure lymphatic fluid leaks may benefit from the sclerotherapy. On the other hand, adjunctive percutaneous glue embolization techniques addition to lipiodol lymphangiography has recently become a minimally invasive interventions for the cases with the high-flow lymphatic leakage [12,18]. NBCA are instantaneous adhesives used since the 1950s. After encountering blood plasma, NBCA starts to polymerize. Since NBCA does not depend on biogenic coagulants, it is effective for patients with coagulopathy [19]. NBCA is indicated for various conditions regardless of the location of the target lesion [20,21]. Since high-flow lymphatic leakage was suspected in this case, we chose direct puncture and NBCA injection therapy instead of sclerotherapy. The dilution rate of the NBCA was determined according to previous studies in which a 33%-50% dilution was used for direct puncture of lymphatic leaking sites [12]. A total amount of 1.5ml of NBCA and Lipiodol mixture was injected to the punctured lymph nodes and draining lymph ducts.

In conclusion, intranodal lymphography and percutaneous lymphatic embolization using NBCA is a powerful treatment option for intractable postoperative lymphorrhea after node dissection.

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Patient Consent Statement

We obtained written informed consent, then, a percutaneous lymphatic embolization using NBCA was performed on the 31st day after surgery. And we also carefully explained and obtained the consent from him about the publication for the case report.
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