Despite the thoracic duct and the cisterna chyli being susceptible to rupture as a result of various traumas, often iatrogenic in origin, a lymphatic fistula complicating spinal surgery is a rare event. Iatrogenic causes of rupture occur during an array of endovascular and surgical procedures, including interventions for esophagectomy, surgical correction of congenital heart defects, sympathectomy, aneurysm surgery, and anterior spinal surgery.¹–⁴ The few reported cases all involved cervical spine surgery.⁵ In sporadic reports the authors have described the iatrogenic rupture of the cisterna chyli after anterior thoracolumbar surgery.⁶ In the unusual case we report, a lymphatic fistula developed during the early postoperative period in a patient with L3–4 spondylolisthesis who had undergone posterior transpedicular screw fixation. The fistula was closed using fibrin glue–based embolization and a musculocutaneous flap.

**Case Report**

**History.** This 70-year-old man was involved in an automobile accident, hospitalized, and underwent surgery for hemoperitoneum and multiple liver lacerations in 1981. During the 5-year period before admission to our department, the patient began to experience bilateral low-back pain associated with sciatica manifested in the left leg.

**Examination.** Magnetic resonance imaging showed signs of diffuse arthrosis and spondylolisthesis involving L-3 and L-4. Flexion–extension radiography confirmed the presence of low-grade (Meyerding Grade II) spondylolisthesis.

**Operation.** The patient underwent posterior lumbar stabilization in which screws, plates, and a bone chip graft were placed. The operation proceeded without technical problems except that a hemostatic clip was required to stop arterial bleeding from below the transverse plane during exposure of the right transverse L-3 process.

**Postoperative Course.** The day after surgery, fluid accumulated beneath the surgical wound, and on Day 4 it necessitated wound revision and placement of a lumbar drain.

**Additional Treatment.** Although the drain remained in place and active for several days, the fluid fistula persisted. Five days later the patient again underwent wound revision; during the reoperation a dural laceration measuring approximately 4 mm was observed and sutured using a hemostatic clip and was suspected as the cause of the fistula. A new lumbar spinal drain was positioned. Despite

Abbreviation used in this paper: CSF = cerebrospinal fluid.

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The authors describe the unique case of a patient who had undergone posterior stabilization of the lumbar spine complicating the course of a lymphatic fistula. A lymphatic fistula is a rare complication of posterior lumbar surgery. Pre-disposing factors include individual anatomy, scarring adherences due to previous abdominal operations or surgical maneuvers deep in the plane of the transverse processes. Because the onset of lymphatic fistulas is subtle, and because they are associated with a high mortality rate and require multidisciplinary treatment, care is needed to avoid misdiagnosing these lesions as the more common cerebrospinal fluid fistula.

**KEY WORDS** • lymphatic fistula • lumbar spine • spinal fixation • percutaneous catheterization

Lymphatic fluid fistula: an extremely rare complication of posterior lumbar transpedicular screw fixation

**Case report**
this precaution, during the ensuing days large amounts of liquid collected beneath the wound. The operative field was again revised, the fixation device was explanted, and the dura mater was found to hold perfectly. Despite all these measures, the wound still failed to heal and continued to ooze a liquid resembling CSF, although it was more dense. A chemical and physical study of the effusion taken directly from the wound unexpectedly disclosed the absence of CSF markers (glucose and β-transferrin), a triglyceride concentration of 44 mg/dl, a lymphocyte count of 1140/mm³ and white blood cell count of 2700/mm³. Perilesional ⁹⁹mTc lymphocyte scintigraphic scans were obtained, with early and late (24-hour) acquisition in anterior and posterior projections. The 24-hour scan revealed a suspicious extra–lymph node radiotracer accumulation in the right mesoabdominal area. Medical therapy with somatostatin and total parenteral (fat-free) nutrition yielded no appreciable improvement. Fluoroscopically guided angiography of the groin lymphatic vessels eventually demonstrated a fistulous tract between L-3 and L-4, and glue-based embolization was performed via the transabdominal approach (Fig. 1). Subsequently with the help of a plastic surgeon we constructed a Z-shaped musculocutaneous flap and turned it over on the musculature, covering the paravertebral gutter of the dural sac. This maneuver definitively resolved the problem and 8 days later the patient was discharged from the hospital without additional complications.

**Final Postoperative Course.** Follow-up examination at 3 months demonstrated that the patient’s body weight and leg trophism had resolved.

**Discussion**

Unlike the other possible well-described complications associated with posterior pedicle screw system–augmented spinal fixation, a lymphatic fluid fistula has rarely been mentioned. In a Medline search for reports involving lymphatic fistulas as a postsurgical complication of posterior spinal surgery, we found only one. This case was described by Rames, et al., who observed a chylothorax in a 16-year-old girl who had undergone corrective surgery for idiopathic scoliosis via an anterior approach alone. The patient underwent the placement of posterior T3–L1 Cotrel–Dubousset instrumentation, and intraoperatively a curette that was inadvertently inserted 1 cm deep lateral to the left T-5 facet joint might have lacerated the thoracic duct or one of its tributary collector ducts. In another series Nakai and Zielke proposed that the lymphatic vessels may rupture not only after direct trauma but also indirectly after maneuvers involved in vertebral column distraction. In describing the details in our unusual case, it is our hope that others can avoid the problems resulting from diagnostic delay; others should consider that a fistula developing after posterior spinal surgery could be lymphatic rather than CSF in origin. The first step to avoiding misdiagnosing the origin of a lymphatic fistula, even if the fluid appears to resemble CSF, is to obtain a fluid specimen for analysis. The lymphatic origin should then be confirmed on venography to visualize the fistula and surrounding anatomy. If these simple steps had been undertaken in our patient at an earlier stage, the unnecessary surgical maneuvers to inspect the dura would have been avoided, and we would have immediately instituted fat-free total parenteral nutrition and subsequent multidisciplinary intervention to close the fistula. The percutaneous transabdominal catheterization of the cisterna chyli, described by Cope, has been shown to be feasible and safe, first in recognizing and then in allowing closure of a postsurgical lymphatic fistula. On computerized tomography scans the cisterna chyli is visualized in the retrocrural space, immersed in the paravertebral tissue, in variable relationships to the T11–L2 vertebral bodies. Precisely how and when the cisterna chyli or lymphatic ducts were damaged in our patient remains unclear. We conjecture that rupture occurred during placement of the transpedicular screw system. The postoperative computerized tomography scan nevertheless showed that the screws were cor-
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rectly placed and documented their trajectory within the pedicules. We did not perform vertebral column distraction maneuvers. The complication most likely arose during the procedures to prepare the transverse processes or during hemostasis, probably due to mechanisms similar to those reported by Rames, et al., even though the fixation was at a more inferior level in the column level in our case than in theirs and was also more caudal to the normal anatomical site of the cisterna chyli and the thoracic lymph duct. The hemostatic procedures used to control the deep-seated hemorrhage lateral to the L-3 transverse process could have ruptured the duct or the cistern. Among predisposing factors in our patient that could have influenced the development of the lymphatic fluid fistula were the numerous abdominal operations he had undergone after the automobile accident. Although none of these previous anterior surgeries led to the creation of fistulas or other complications, they might nevertheless have predisposed the patient to thoracic duct or the cistern rupture because the scar adherences rendered these structures more fixed and, therefore, unusually liable to damage during aggressive posterior spinal surgery. Because of the lack of similar cases for comparison and because of the anomalous venographic findings, we attribute the complications in this case to rare anatomical variations in the course of the main lymphatic ducts. In patients who have previously undergone reoperations, scar adherences may be predispose them to the aforementioned ruptures. To avoid this, the key point is to establish the differential diagnosis with the more common CSF fistula before the patient’s condition begins an inevitable deterioration. Once recognized, a cisterna chyli lymphatic fluid collection developing after posterior lumbar surgery responds relatively quickly to multidisciplinary management involving closure of the tract and cosmetic repair of the skin opening.

References


Manuscript received September 26, 2005. Accepted in final form February 7, 2006.

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