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Radiculopathy due to microfibrillar collagen hemostat mimicking recurrence of disc herniation

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Radiculopathy due to microfibrillar collagen hemostat mimicking the recurrence of disc herniation

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Abstract

Microfibrillar collagen hemostat (Avitene) is an absorbable topical hemostatic agent prepared from purified bovine corium collagen. A 65-year-old woman presented with left buttock and lower extremity radicular pain. The patient underwent a disc excision in which Avitene was used to control venous bleeding from the epidural space. Leg pain decreased postoperatively, but she developed radicular pain when she started walking three days after the operation. Magnetic resonance imaging (MRI) taken post-operatively showed there was a mass lesion located between the dural sac and L5 nerve root. The lesion exhibited high signal intensity on T1- weighted images and higher signal intensity at the rim of the mass on T2-weighted images. A second operation performed 10 days later revealed the nerve root was adherent to an extradural granulomatous mass associated with Avitene. Macroscopically, the resected mass was found to be composed mainly of microfibrillar collagen hemostat materials. Hemostat agents may produce a clinically symptomatic, radiologically apparent mass lesion. When considering a mass lesion arising after spine surgery, the differencial diagnosis should include foreign body granuloma along with recurrent disc herniation and peridural scar formation.

Key Words: radiculopathy, lumbar spine, microfibrillar collagen hemostat (Avitene),

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recurrent disc herniation, MRI

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Introduction

A variety of hemostatic agents are routinely used to control intraoperative bleeding in many surgical subspecialties, including neurosurgery and general surgery. Although not originally intended as permanent implants, in practice bioabsorbable hemostats are often left in the surgical bed to prevent rebleeding after surgical closure. However, the resorbable hemostat agents may induce an excessive inflammatory reaction in the vicinity of the surgical site, which can produce a clinically symptomatic and/or radiologically apparent mass lesion that is often indistinguishable from a recurrent tumor on clinical and neuroimaging studies [1,2,3,4,5,6,7].

To our knowledge, this is the first report indicating microfibrillar collagen hemostat (Avitene; C.R.Bard, Inc., Murray Hills, NJ)[8] as a cause of radiculopathy, although it has been previously reported to cause intraperitoneal foreign body granuloma [1,2,3,7]. This case is note-worthy in that collagen hemostat may produce as epidural mass mimicking a lumbar disc recurrence inducing radiculopathy. Characteristic images are also shown for magnetic resonance imaging (MRI).

Case Report

A 65-year-old woman presented with the chief complaint of acute onset of left

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buttock and lower extremity radicular pain. The patient underwent a left L4-5 microdiscectomy in which microfibrillar collagen hemosta (Avitene) was used to control venous bleeding from the epidural space. We irrigated and sucked the wound intensely prior to surgical closure. Leg pain decreased postoperatively, but she developed radicular pain when she started walking three days after operation. Magnetic resonance imaging (MRI) taken post-operatively showed there was a mass lesion located between the dural sac and L5 nerve root. The lesion exhibited slightly high signal intensity on T1- weighted images (Fig. 1) and higher signal intensity at the rim of the mass on T2-weighted images (Fig. 2), indicating epidural hematoma or recurrent disc herniation. Recurrence of the lumbar disc herniation was suspected by radiologists because the rim of the mass showed high signal intensity on T2-weighted MRI.

A second operation performed 10 days later revealed the nerve root was adherent to an extradural granulomatous mass associated with Avitene. Macroscopically, the resected mass was found to be composed mainly of microfibrillar collagen hemostat materials.

Discussion

Although lumbar discectomy for appropriately chosen patients is successful in most

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cases, 8-25% of patients have recurrent low back pain and/or sciatica [9]. The success of a second operation depends on appropriate diagnosis. Recurrent or residual disc herniation at the level of surgery is a common cause of recurrent back and leg pain. Patients with recurrent disc herniation tend to show improvement, whereas those with scar formation tend to show little improvement [10]. Therefore, it is important to differentiate recurrent disc herniation from epidural and peridural scar formation. Making the distinction between scar and disc has been attempted with myelography, computed tomography (CT) and magnetic resonance imaging (MRI). Mullin et al [11] reported that T2-weighted MRI was highly accurate in diagnosing recurrent disc herniation (94-97%) and that routine use of gadolinium was unnecessary in postoperative MRI of the lumbar spine.

Following placement of a resorbable hemostat agent, a physiologic inflammatory response develops around the hemostat until complete absorption is achieved [12]. In the majority of patients this process is asymptomatic. However, an exuberant inflammatory reaction directed against the foreign materials sometimes produces a space-occupying mass. Microfibrillar collagen (Avitene), which not only exerts a local matrix-forming effect to induce hemostasis but actively promotes coagulation and platelet aggregation, is often used in neurosurgical practice [8]. With this material, there

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have been a few reported cases of foreign body reaction, with imaging studies suggesting tumor recurrence [1,2,3,7]. However, there have been no reported cases indicating microfibrillar collagen hemostat as a cause of radiculopathy. This case demonstrates an epidural mass mimicking a recurrent disc herniation after lumbar disc surgery. The lesion exhibited a slightly high signal intensity on T1- weighted images and higher signal intensity at the rim of the mass on T2-weighted images, indicating epidural hematoma or recurrent disc herniation. A slightly high signal intensity on T1-weighted images was consistent with an epidural hematoma. However, recurrence of the lumbar disc herniation was suspected by radiologists because the rim of the mass showed high signal intensity on T2-weighted MRI. Epidural scar formation was not visible three days after operation. Thus, some controversy still exists concerning the MRI findings in this case.

Resorbable hemostatic agents are used in all spine surgeries at our institute and are left in situ in some cases. The pathologic reaction described in this article thus occurs only in a small minority of a large number of patients in whom such materials are left within the spinal canal. Nevertheless, it is important to recognize the manufacturers of several agents recommend removal of the material once hemostasis is achieved. Avitene is less likely to provoke a major reaction, but its manufacturer also suggests removing

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excess materials before surgical closure. We recommend that residual materials be kept to a minimum in the spinal canal, particularly adjacent to delicate structures like nerve root, and that they are avoided altogether within the spinal cord.

Hemostat agents may produce a clinically symptomatic, radiologically apparent mass lesion. When considering a mass lesion arising after spine surgery, the differencial diagnosis should include foreign body granuloma along with recurrent disc herniation and peridural scar formation.

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Figure legend

Figure 1. Axial T1-weighted magnetic resonance image (TR 516 msec, TE 16 msec) revealing a slightly high signal intense mass (black arrow) between the dural sac and L5 nerve root (white arrow).

Figure 2. Axial T2-weighted image (TR 3000 msec, TE 93 msec) revealing higher signal intensity at the rim of the mass (black arrow) between the dural sac and L5 nerve root (white arow).

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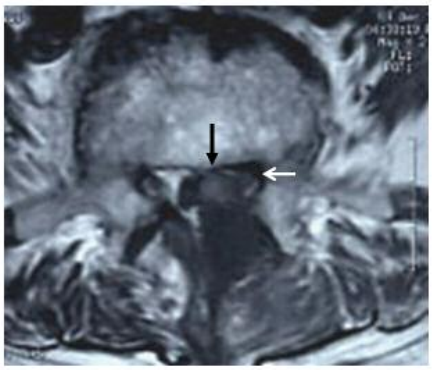

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