Terson's syndrome following epidural saline injection
Ayman Naseri, MD; Mark S. Blumenkranz, MD; and Jonathan C. Horton, MD, PhD

Terson's syndrome refers to vitreous hemorrhage after intracranial hemorrhage, often from rupture of an aneurysm. The source of vitreous blood has never been established conclusively. Blood may track along the subarachnoid space of the optic nerve sheath and enter the vitreous cavity through the optic nervehead. Alternatively, the sudden spike in intracranial pressure may burst retinal vessels. We describe a rare case of vitreous hemorrhage after epidural saline injection that offers a clue to the origin of the vitreous blood in Terson's syndrome.

Case report. A 39-year-old telephone dispatcher developed chronic low back pain that could not be relieved by physical therapy. She was treated with a series of lumbar epidural steroid injections over a 6-month period. An inadvertent dural puncture occurred, giving rise to a persistent postdural puncture headache. After bedrest, analgesics, and oral hydration failed to bring relief, she was treated with two lumbar epidural blood patches, which were also ineffective. She was then offered epidural saline infusion.

The procedure was performed by an anesthesiologist under IV sedation with propofol and midazolam. After the patient was placed in the left lateral decubitus position, 3 mL of lidocaine HCl was injected into the soft tissues overlaying the L3–4 interspace. A spinal needle was inserted. When the spinal needle was thought to be in the epidural space, the anesthesiologist verified that no blood or CSF could be aspirated. He then infused 5 mL of lidocaine. After waiting a few minutes for the drug to diffuse, he next briskly injected 100 mL of sterile physiologic saline. The patient did not report pain. After the needle was withdrawn she was placed in a supine position for 5 minutes. During this period she became aware of severe visual loss in the right eye and scotomata in the left eye. She was referred to an ophthalmologist who examined her within an hour of the procedure.

Visual acuity was hand motions in the right eye and 20/2000 in the left eye with best correction. Dilated examination revealed vitreous and subhyaloid hemorrhages in the right eye that obscured the retina nearby completely (figure). In the left eye there were intraretinal hemorrhages concentrated around the optic disc. An MR scan showed no subarachnoid blood. A vitreectomy was performed 3 weeks later to remove the hemorrhage from the right eye. The minor hemorrhages in the left eye resolved spontaneously. A few months later visual acuity had improved to 20/20 in each eye.

Discussion. Our patient had a phenomenon akin to Terson's syndrome after a 100-mL saline injection into the epidural space. Subarachnoid pressure has been measured experimentally after injection of 10 to 20 mL of saline into the lumbar epidural space.1 Typically, intradural pressure spikes averaged 50 cm of water, with occasional spikes ranging up to 85 cm. Spike amplitude depended on the rate and volume of the fluid injection. After each injection, subarachnoid pressure returned to baseline within 10 minutes.

The epidural injection in our case was tantamount to rupture of an intracranial aneurysm, because it resulted in an abrupt, transient spike in subarachnoid pressure. The injected fluid was saline, not blood; therefore it could not have been the source of the vitreous hemorrhage. This strongly implies that in Terson's syndrome, the source of vitreous blood is not intracranial, but ocular. The sudden elevation of intracranial pressure probably causes sudden intraocular venous hypertension, leading to bleeding from retinal vessels.

Other cases of vitreous hemorrhage after epidural saline injection support this idea.3,4 Retinal bleeding without vitreous hemorrhage has also been described.4,5 All cases of ocular bleeding after epidural injection have occurred between volumes 40 and 120 mL, except for a single case that followed a 20-mL injection.4 Retinal hemorrhage can also occur after epiduroscopy. In one case, bilateral retinal hemorrhages occurred after saline infusion into the epidural space.6 The total volume injected was not specified, but pressure was maintained at 60 mm Hg (~78 cm H2O) for 5 minutes. In a second case caused by epiduroscopy, no data were given about volume or pressure.7

Blood patch in the management of postdural puncture headache is used much more frequently than epidural saline infusion.

References

Figure. (Left) Right fundus 16 days after epidural saline injection shows a vitreous hemorrhage associated with layering (arrow) of red blood cells in the subhyaloid space. (Right) Left fundus shows deep and superficial retinal hemorrhages near the optic disc.