programming of stimulation settings. STN, VIM and now GP have all been reported to have utility in the treatment of dystonic tremor.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.jocn.2013.02.009.

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doi:http://dx.doi.org/10.1016/j.jocn.2013.02.009

Cortical blindness following posterior lumbar decompression and fusion

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ARTICLE INFO

Article history:
Received 18 July 2012
Accepted 18 December 2012

Keywords:
Cortical blindness
Lumbar surgery
Occipital stroke

ABSTRACT

Perioperative vision loss following non-ocular surgery is a well-documented phenomenon. In particular, perioperative vision loss has been frequently cited following spinal surgery. Although the rate of vision compromise in spinal surgery is relatively low, the consequences can be quite severe and devastating for the patient. We report a 60-year-old woman who initially presented with back and left leg pain as well as paraparesis. Imaging studies of the lumbar spine showed bony erosion consistent with tumor infiltration of the L3 and L4 spinal segments. Laminectomy at the L2–L4 levels for decompression of the intraspinal tumor was performed. Pathology of the resected bone was consistent with metastatic adenocarincoma. Postoperatively, the patient suffered severe anemia and bilateral infarctions of the posterior cerebral arteries and occipital lobes resulting in vision compromise. Although a definitive pathogenesis remains unknown, preoperative cardiovascular issues and intraoperative hemodynamic instabilities have typically been implicated as high risk factors. High risk factors for this novel clinical presentation of visual compromise following posterior lumbar laminectomy with decompression for an intraspinal tumor are reported.

1. Introduction

Perioperative vision loss during non-ocular surgery is a well-documented phenomenon, particularly in spinal procedures.[1–3] Reviews have cited perioperative vision loss in non-ocular,[3–7] orthopedic,[8] and spinal surgeries,[1,2,9,10] including lumbar spine.[11] Of non-ocular procedures, spinal and cardiovascular surgeries have been associated with the highest incidence of perioperative vision loss. Incidence of spinal surgery perioperative vision loss ranges from 0.2% to 0.028%, reportedly 200-fold higher than all other surgical procedures.[1,3,12] Patil et al. reported a 0.14% incidence in lumbar fusion surgeries.[13] Although the occurrence in spinal surgery is relatively low, the results can be debilitating for the patient. While the etiology of perioperative vision loss remains controversial, anterior or posterior ischemic optical neuropathy and retinal vascular occlusion are the most frequently cited causes.[4,14–16] Despite the increasing attention in the literature to perioperative vision loss accompanying spinal surgery, its pathogenesis remains uncertain. Specific risk factors for vision loss following spinal surgeries include the prone position, hypotension, and anemia.[4,11,17]

Prolonged spinal surgeries in the prone position have continually been noted in patients with perioperative vision loss.[14,18–21] Perioperative vision loss during spinal surgery has also been associated with increased intraocular pressure, potentially induced by the aforementioned restrictive prone position during lengthy surgical procedures.[1,22] In a review of 93 patients who underwent spinal surgery and suffered perioperative vision loss, Zimmerer and Koehler determined that 27.3% were thoracic, 18.2% were lumbar, and 54.5% were cervical surgeries.[12] In another retrospective review, Stevens et al. evaluated ophthalmic complications in 3 450 spinal surgeries, and identified operative time, blood loss, patient positioning, controlled intraoperative hypotension, hypertension, and a history of peripheral vascular, cardiovascular, or ophthalmic disease as contributing factors to perioperative vision loss (Table 1).[1] Kaeser and Borruat recommended immediate ophthalmic consultation after surgery for patients with high risk factors for perioperative vision loss, because a correction of anemia, hypotension, and/or hypovolemia can be therapeutically beneficial, although rarely results in the recovery of vision.[8]

While the literature contains limited, mostly retrospective publications on spinal surgery and perioperative vision loss due to ischemic optical neuropathy, even fewer publications specifically review lumbar surgery and perioperative vision loss associated with cortical blindness. We present a 60-year-old woman who suffered

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Table 1
Major studies reviewing incidence of perioperative vision loss following spinal surgery

Investigators	Number of patients	Incidence of perioperative vision loss (%)
Patil et al.[13]	728815	0.094
Shen et al.[7]	465345	0.031
Stevens et al.[1]	3450	0.20
Roth et al.[5]	1100	0.09

perioperative vision loss from cortical blindness during posterior lumbar laminectomy and decompression for an intraspinal tumor.

2. Case report

2.1. History and examination

A 60-year-old woman presented with back and left leg pain as well as paraparesis. She had a history of morbid obesity (weight was 147 kg; height was 165 cm; and body mass index was 54.1 kg/m^2), hypertension, deep vein thrombosis, and ovarian cancer which was successfully treated with chemotherapy. The patient had no history of diabetes and denied smoking. A CT scan of her lumbar spine demonstrated bony erosion consistent with tumor infiltration of the L3 and L4 spinal segments (Fig. 1). A preoperative CT scan of the brain was used to rule out metastatic disease (Fig. 2).

Fig. 2. Preoperative axial CT scan of the head with contrast to rule out cranial metastases showing that no posterior cerebral artery infarcts were present.

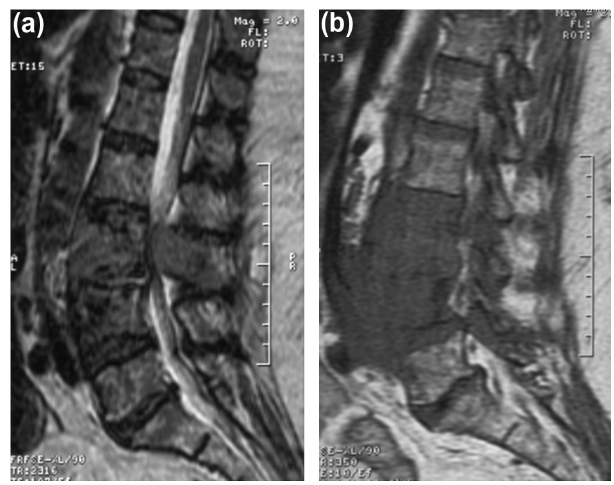

Fig. 3. Sagittal MRI T2-weighted scan demonstrating L3 and L4 bony replacement with disk sparing.

2.2. Surgery and pathological findings

The patient underwent laminectomies at the L2–L4 levels for decompression of the intraspinal tumor. Pathological examination of a resected bone sent as a frozen section yielded a result consistent with glandular type metastatic adenocarincoma. Immunostains showed focal positive reactivity with cytokeratin (CK) 7, but not to CK 20, thereby indicative of endometrial carcinoma, miliary tract, or pancreatic origin. The tumor was resected using a left L3 transpedicular approach. MRI demonstrated L3 and L4 bony replacement with disk sparing (Fig. 3). Posterior arthrodesis from the L1 to L5 levels was achieved using instrumentation, nonstructural allograft, and left iliac crest nonstructural autograft (Fig. 4). A layered closure completed the operation. During the operation, approximately 420 minutes in all, systolic blood pressure averaged between 110–120 mmHg, while diastolic blood pressure averaged between 60–70 mmHg throughout. The patient's baseline blood pressure ranged from a systolic of 130–145 over a diastolic of 80–90 consistently. The patient's heart rate was approximately 70–80 beats per minute for the duration of the operation. Hematocrit of 35% was obtained early during the surgery and repeated approximately every 1.5 hours throughout, yielding additional values of 31%, 26%, and 29%. Thus, intraoperative arterial blood gas tests demonstrated that though the patient may have been

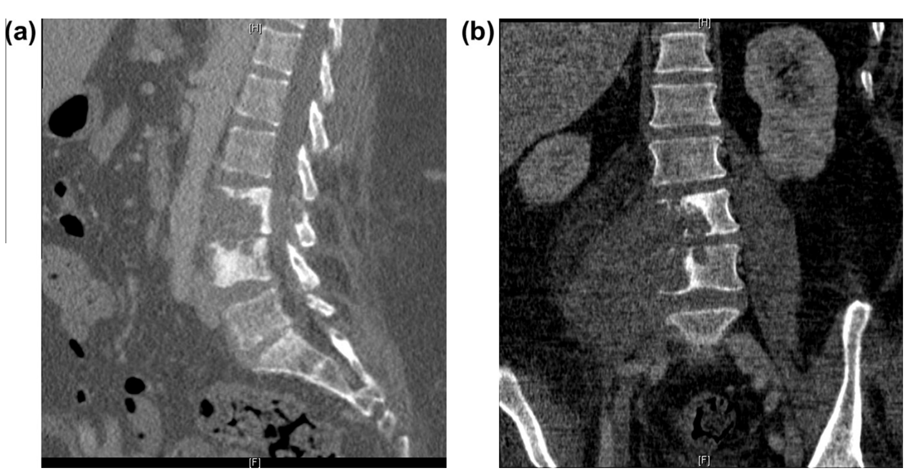

Fig. 1. Preoperative (a) sagittal and (b) coronal CT scan of lumbar spine demonstrating C3 and C4 bony destruction.