

ASA Practice Advisory for Perioperative Visual Loss Advisory Associated with Spine Surgery 2019 Update – Supplement 3: Bibliography by Section

Preoperative Patient Evaluation and Preparation: Patient condition

Observational studies or non-pertinent comparison groups

1. Calway T, Rubin DS, Moss HE, Joslin CE, Mehta AI, Roth S: Perioperative retinal artery occlusion: incidence and risk factors in spinal fusion surgery from the us national inpatient sample 1998–2013. *J Neuroophthalmol* 2018; 38:36-41
2. De la Garza-Ramos R, Samdani AF, Sponseller PD, Ain MC, Miller NR, Shaffrey CI, Sciubba DM: Visual loss after corrective surgery for pediatric scoliosis: Incidence and risk factors from a nationwide database. *Spine J* 2016; 16:516-22
3. Katz DM, Trobe JD, Cornblath WT, Kline LB: Ischemic optic neuropathy after lumbar spine surgery. *Arch Ophthalmol* 1994; 112:925-31
4. Lee LA, Roth S, Posner KL, Cheney FW, Caplan RA, Newman NJ, Domino KB: The American Society of Anesthesiologists Postoperative Visual Loss Registry: Analysis of 93 spine surgery cases with postoperative visual loss. *Anesthesiology* 2006; 105:652-9
5. Lee LA, Roth S, Todd MM, Posner KL, Polissar NL, Neradilek MB, Torner J, Newman NJ, Domino KB, Lauer KK, Buddithi R, Gollapudy S, Pajewski TN, Scalzo DC, Avitsian R, Brown MJ, Buenvenida S, Mashour GA, Moore LE, Samra SK, Lieberman J, Lane RK, Ramani R, Wagner J, Tempelhoff R, Monsey CM, Robicsek SA, Vu MM, Weeks J, Manninen PH, Fu ES, Sanchez-Yanes GC, Peterfreund RA, Albrecht MA, Sapire KJ, Baughman VL, Caplan RA, Cheney FW, Metzner J: Risk factors associated with ischemic optic neuropathy after spinal fusion surgery. *Anesthesiology* 2012; 116:15-24
6. Nandyala SV, Marquez-Lara A, Fineberg SJ, Singh R, Singh K: Incidence and risk factors for perioperative visual loss after spinal fusion. *Spine J* 2014; 14:1866-72
7. Patil CG, Lad EM, Lad SP, Ho C, Boakye M: Visual loss after spine surgery: A population-based study. *Spine (Phila Pa 1976)* 2008; 33:1491-6
8. Rubin DS, Parakati I, Lee LA, Moss HE, Joslin CE, Roth S: Perioperative visual loss in spine fusion surgery: Ischemic optic neuropathy in the United States from 1998 to 2012 in the nationwide inpatient sample. *Anesthesiology* 2016; 125:457-64
9. Shillingford JN, Laratta JL, Sarpong NO, Swindell H, Cerpa M, Lehman RA, Lenke LG, Fischer C: Visual loss following spine surgery: What have we seen within the scoliosis research society morbidity and mortality database? *Spine (Phila Pa 1976)* 2018; 43:1201-07
10. Stevens WR, Glazer PA, Kelley SD, Lietman TM, Bradford DS: Ophthalmic complications after spinal surgery. *Spine (Phila Pa 1976)* 1997; 22:1319-24

Case reports or series

1. Agarwal N, Hansberry DR, Goldstein IM: Cortical blindness following posterior lumbar decompression and fusion. *J Clin Neurosci* 2014; 21:155-9
2. Alexandrakis G, Lam BL: Bilateral posterior ischemic optic neuropathy after spinal surgery. *Am J Ophthalmol* 1999; 127:354-5
3. Amorim Correa JL, Acioly MA: The enigma of orbital compartment syndrome after lumbar spine surgery in the prone position: Case report and literature review. *World Neurosurg* 2018; 110:309-14
4. Bojinova RI, Konieczka K, Todorova MG: Unilateral loss of vision after spinal surgery in a patient with flammer syndrome. *Klin Monatsbl Augenheilkd* 2016; 233:429-31 Dilger JA, Tetzlaff JE, Bell GR, Kosmorsky GS, Agnor RC, O'Hara JF, Jr.: Ischaemic optic neuropathy after spinal fusion. *Can J Anaesth* 1998; 45:63-6
5. Chung MS, Son JH: Visual loss in one eye after spinal surgery. *Korean J Ophthalmol* 2006; 20:139-42
6. Dilger JA, Tetzlaff JE, Bell GR, Kosmorsky GS, Agnor RC, O'Hara JF, Jr.: Ischaemic optic neuropathy after spinal fusion. *Can J Anaesth* 1998; 45:63-6
7. Dunker S, Hsu HY, Sebag J, Sadun AA: Perioperative risk factors for posterior ischemic optic neuropathy. *J Am Coll Surg* 2002; 194:705-10
8. Goni V, Tripathy SK, Goyal T, Tamuk T, Panda BB, Bk S: Cortical blindness following spinal surgery: very rare cause of perioperative vision loss. *Asian Spine J* 2012; 6:287-90
10. Hoff JM, Varhaug P, Midelfart A, Lund-Johansen M: Acute visual loss after spinal surgery. *Acta Ophthalmol* 2010; 88:490-2

11. Jampol LM, Goldbaum M, Rosenberg M, Bahr R: Ischemia of ciliary arterial circulation from ocular compression. *Arch Ophthalmol* 1975; 93:1311-7
12. Kasodekar VB, Chen JL: Monocular blindness: a complication of intraoperative positioning in posterior cervical spine surgery. *Singapore Med J* 2006; 47:631-3
13. Katz DA, Karlin LI: Visual field defect after posterior spine fusion. *Spine (Phila Pa 1976)* 2005; 30:E83-5
14. Katzman SS, Moschonas CG, Dzioba RB: Amaurosis secondary to massive blood loss after lumbar spine surgery. *Spine* 1994; 19:468-9
15. Kueper J, Loftus ML, Boachie-Adjei O, Lebl D: Posterior reversible encephalopathy syndrome: temporary visual loss after spinal deformity surgery. *Am J Orthop (Belle Mead NJ)* 2015; 44:E465-8
16. Lee AG: Ischemic optic neuropathy following lumbar spine surgery. Case report. *J Neurosurg* 1995; 83:348-9
17. Reddy A, Foroozan R, Edmond JC, Hinckley LK: Dilated superior ophthalmic veins and posterior ischemic optic neuropathy after prolonged spine surgery. *J Neuroophthalmol* 2008; 28:327-8
18. Ripart J, Desmots JM: Loss of vision after anaesthesia for nonophthalmic surgery: A persistent problem. *Eur J Anaesthesiol* 2009; 26:524-6
19. Roth S, Nunez R, Schreider BD: Unexplained visual loss after lumbar spinal fusion. *J Neurosurg Anesthesiol* 1997; 9:346-8
20. Roth S, Tung A, Ksiazek S: Visual loss in a prone-positioned spine surgery patient with the head on a foam headrest and goggles covering the eyes: An old complication with a new mechanism. *Anesth Analg* 2007; 104:1185-7
21. Yilmaz M, Kalemci O: Visual loss after lumbar discectomy due to cortical infarction: case report. *J Neurol Sci* 2013; 30:422-6
22. Yu YH, Chen WJ, Chen LH, Chen WC: Ischemic orbital compartment syndrome after posterior spinal surgery. *Spine (Phila Pa 1976)* 2008; 33:E569-72
23. Zimmerer S, Koehler M, Turtschi S, Palmowski-Wolfe A, Girard T: Amaurosis after spine surgery: survey of the literature and discussion of one case. *Eur Spine J* 2011; 20:171-6

Preoperative Patient Evaluation and Preparation: Ophthalmic or neuro-ophthalmic evaluation

No Entries

Preoperative Patient Evaluation and Preparation: Prolonged procedures (≥4 hr)

Case reports or series

1. Agarwal N, Hansberry DR, Goldstein IM: Cortical blindness following posterior lumbar decompression and fusion. *J Clin Neurosci* 2014; 21:155-9
2. Akpınar E, Okutan MO, Gürbüz MS, Bitirgen G: Unilateral vision loss without ophthalmoplegia as a rare complication of spinal surgery. *J Neurosci Rural Pract* 2017; 8:288-90
3. Amorim Correa JL, Acioly MA: The enigma of orbital compartment syndrome after lumbar spine surgery in the prone position: Case report and literature review. *World Neurosurg* 2018; 110:309-14
4. Chalam KV, Shah VA: Severe bilateral posterior ischemic optic neuropathy as a complication of spinal surgery. *Eye (Lond)* 2005; 19:367-8
5. Grossman W, Ward WT: Central retinal artery occlusion after scoliosis surgery with a horseshoe headrest. Case report and literature review. *Spine (Phila Pa 1976)* 1993; 18:1226-8
6. Kumar N, Jivan S, Topping N, Morrell AJ: Blindness and rectus muscle damage following spinal surgery. *Am J Ophthalmol* 2004; 138:889-91
7. Leibovitch I, Casson R, Laforest C, Selva D: Ischemic orbital compartment syndrome as a complication of spinal surgery in the prone position. *Ophthalmology* 2006; 113:105-8
8. Locastro A, Novak KD, Biglan AW: Central retinal artery occlusion in a child after general anesthesia. *Am J Ophthalmol* 1991; 112:91-2
9. Mertens E, Smets RM, Sys J, Michielsen J, Verstreken J, Tassignon MJ: Central retinal artery occlusion after back surgery: a case report. *Bull Soc Belge Ophtalmol* 1995; 255:127-31
10. Shifa J, Abebe W, Bekele N, Habte D: A case of bilateral visual loss after spinal cord surgery. *Pan Afr Med J* 2016; 23:119
11. West J, Askin G, Clarke M, Vernon SA: Loss of vision in one eye following scoliosis surgery. *Br J Ophthalmol* 1990; 74:243-4

Preoperative Patient Evaluation and Preparation: Substantial blood loss (≥800 ml)

Case reports or series

1. Bermejo-Alvarez MA, Crpintero M, Garcia-Carro G, Acebal G, Fervienza P, Cosio F: Ischemic optic neuropathy after lumbar spine surgery. *Rev Esp Anesthesiol Reanim* 2007; 54:621-5
2. Bradish CF, Flowers M: Central retinal artery occlusion in association with osteogenesis imperfecta. *Spine* 1987; 12:193-4
3. Brown RH, Schauble JF, Miller NR. Anemia and hypotension as contributors to perioperative loss of vision. *Anesthesiology* 1994; 80:222-6
4. Hoff JM, Varhaug P, Midelfart A, Lund-Johansen M: Acute visual loss after spinal surgery. *Acta Ophthalmol* 2010; 88:490-2
5. Huber JF, Grob D: Bilateral cortical blindness after lumbar spine surgery. *Spine* 1998; 23:1807-9
6. Ibrahim TF, Sweis RT, Nockels RP: Reversible postoperative blindness caused by bilateral status epilepticus amauroticus following thoracolumbar deformity correction: Case report. *J Neurosurg Spine* 2017; 27:63-7
7. Jampol LM, Goldbaum M, Rosenberg M, Bahr R: Ischemia of ciliary arterial circulation from ocular compression. *Arch Ophthalmol* 1975; 93:1311-7
8. Lee AG: Ischemic optic neuropathy following lumbar spine surgery. *J Neurosurg* 1995; 83:348-9
9. Mohan K, Rawall S, Nene A: Visual loss after spine surgery. *Indian J Orthopaed* 2012; 46:106-8
10. Wolfe SW, Lospinuso MF, Burke SW: Unilateral blindness as a complication of patient positioning for spinal surgery. A case report. *Spine* 1992; 17:600-5

Preoperative Patient Evaluation and Preparation: Prolonged procedures combined with substantial blood loss

Observational studies or non-pertinent comparison groups

1. Chang, SH, Miller NR: The incidence of visual loss due to perioperative ischemic optic neuropathy associated with spine surgery: The Johns Hopkins Hospital Experience. *Spine* 2005; 30:1299-1302
2. Cheng MA, Sigurdson W, Tempelhoff R, Laurysen C: Visual loss after spine surgery: a survey. *Neurosurg* 2000; 46:625-31
3. Farag E, Abd-Elsayed AA, Dalton JE, Nada E, Parker BM: Postoperative vision loss after spine surgery: a single-institution case-control comparison. *Ochsner J* 2014; 14:179-183
4. Katz DM, Trobe JD, Cornblath WT, Kline LB: Ischemic optic neuropathy after lumbar spine surgery. *Arch Ophthalmol* 1994; 112:925-31
5. Lee LA, Roth S, Posner KL, Cheney FW, Caplan RA, Newman NJ, Domino KB: The American Society of Anesthesiologists Postoperative Visual Loss Registry: Analysis of 93 spine surgeries associated with postoperative visual loss. *Anesthesiology* 2006; 105:652-59
6. Lee LA, Roth S, Todd MM, Posner KL, Polissar NL, Neradilek MB, Torner J, Newman NJ, Domino KB, Lauer KK, Budithi R, Gollapudy S, Pajewski TN, Scalzo DC, Avitsian R, Brown MJ, Buenvenida S, Mashour GA, Moore LE, Samra SK, Lieberman J, Lane RK, Ramani R, Wagner J, Tempelhoff R, Monsey CM, Robicsek SA, Vu MM, Weeks J, Manninen PH, Fu ES, Sanchez-Yanes GC, Peterfreund RA, Albrecht MA, Sapire KJ, Baughman VL, Caplan RA, Cheney FW, Metzner J: Risk factors associated with ischemic optic neuropathy after spinal fusion surgery. *Anesthesiology* 2012; 116:15-24
7. Shillingford JN, Laratta JL, Sarpong NO, Swindell H, Cerpa M, Lehman RA, Lenke LG, Fischer C: Visual loss following spine surgery: What have we seen within the scoliosis research society morbidity and mortality database? *Spine (Phila Pa 1976)* 2018; 43:1201-7
8. Stevens WR, Glazer PA, Kelley SSD, Leitman TM, Bradford DS: Ophthalmologic complications after spinal surgery. *Spine* 1997; 22:1319-24

Case reports or series

1. Alexandrakis G, Lam BL: Bilateral posterior ischemic optic neuropath after spinal surgery. *Am J Ophthalm* 1999; 127:354-5
2. Bojinova RI, Konieczka K, Todorova MG: Unilateral loss of vision after spinal surgery in a patient with flammer syndrome. *Klin Monatsbl Augenheilkd* 2016; 233:429-31

3. Chung MS, Son JH: Visual loss in one eye after spinal surgery. *Korean J Ophthalmol* 2006; 20:139-42
4. Dilger JA, Tetzlaff, JE, Bell GR, Kosmorsky GS, Agnor RC, O'Hara JF: Ischaemic optic neuropathy after spinal fusion. *Can J Anaesth* 1998; 45:63-6
5. Dunker S, Hsu HY, Sebag J, Sadun AA: Perioperative risk factors for posterior ischemic optic neuropathy. *Am Coll Surg* 2002; 194:705-10
6. Hassani V, Mohsen Homaei M, Mahdi Zamani M, Safari S, Nadi S, Shahbazi A, Alizadeh Zendehtrood S, Rahimizadeh A, Hossein Lashkari M: Human erythropoietin effect in postoperative visual loss following spine surgery: a case report. *Anesthesiol Pain Med* 2014; 4:
7. Kamming D, Clarke S: Postoperative visual loss following prone spinal surgery. *Br J Anaesth* 2005; 95:257-60
8. Katz DA, Karlin LI: Visual field defect after posterior spine fusion. *Spine (Phila Pa 1976)* 2005; 30:E83-5
9. Katzman SS, Moschonas CG, Dzioba RB: Amaurosis secondary to massive blood loss after lumbar spine surgery. *Spine* 1994; 19:468-9
10. Kim JW, Hills WL, Rizzo JF, Egan RA, Lessell S: Ischemic optic neuropathy following spine surgery in a 16-year-old patient and a ten-year old patient. *J Neuroophthalmol* 2006; 26:30-3
11. Kueper J, Loftus ML, Boachie-Adjei O, Lebl D: Posterior reversible encephalopathy syndrome: temporary visual loss after spinal deformity surgery. *Am J Orthop (Belle Mead NJ)* 2015; 44:E465-8
12. Lee LA, Lam AM: Unilateral blindness after prone lumbar spine surgery. *Anesthesiology* 2001; 95:793-5
13. Lee SH, Chung I, Choi DS, Shin IW, Kim S, Kang S, Kim JY, Chung YK, Sohn JT: Visual loss due to optic nerve infarction and central retinal artery occlusion after spine surgery in the prone position: A case report. *Medicine (Baltimore)* 2017; 96:e7379
14. Mishra RK, Mahajan C, Bindra A, Goyal K: Postoperative visual loss following dorsal root entry zone rhizotomy: a dreaded complication after a benign procedure. *Saudi J Anaesth* 2016; 10:449-52
15. Murphy MA: Bilateral posterior ischemic optic neuropathy after lumbar spine surgery. *Ophthalmology* 2003; 110:1454-7
16. Nakra D, Bala I, Pratap M: Unilateral postoperative visual loss due to central retinal artery occlusion following cervical spine surgery in prone position. *Paediatr Anaesth* 2007; 17:805-8
17. Park JY, Lee IH, Song CJ, Hwang HY: Diffusion mr imaging of postoperative bilateral acute ischemic optic neuropathy. *Korean J Radiol* 2012; 13:237-9
18. Quraishi NA, Wolinsky J-P, Gokaslan ZL: Transient bilateral post-operative visual loss in spinal surgery. *Eur Spine J* 2012; 21 Suppl 4:S495-S498
19. Reddy A, Foroozan R, Edmond JC, Hinckley LK: Dilated superior ophthalmic veins and posterior ischemic optic neuropathy after prolonged spine surgery. *J Neuroophthalmol* 2008; 28:327-8
20. Ripart J, Desmots JM: Loss of vision after anaesthesia for nonophthalmic surgery: a persistent problem. *Eur J Anaesthesiol* 2009; 26:524-6
21. Roth S, Nunez R, Schreider BD: Unexplained visual loss after lumbar spinal fusion. *J Neurosurg Anesth* 1997; 9:346-8
22. Samdani AF, Rutter L, Betz RR, Mulcahey MJ: Vision loss after spinal fusion for scoliosis in a child with spinal cord injury. *J Spinal Cord Med* 2009; 32:591-4
23. Stang-Veldhouse KN, Yeu E, Rothenberg DM, Mizen TR: Unusual presentation of perioperative ischemic optic neuropathy following major spine surgery. *J Clin Anesth* 2010; 22:52-5
24. Yu YH, Chen WJ, Chen LH, Chen WC: Ischemic orbital compartment syndrome after posterior spinal surgery. *Spine (Phila Pa 1976)* 2008; 33:E569-72

Intraoperative Blood Pressure Management: Continual monitor systemic blood pressure for high-risk patients

No Entries

Intraoperative Blood Pressure Management: Deliberate hypotension techniques in high-risk patients (lengthy procedures or substantial BL) without preoperative chronic hypertension

Case reports or series

1. Bradish CF, Flowers M: Central retinal artery occlusion in association with osteogenesis imperfecta. *Spine* 1987; 12:193-4

2. Brown RH, Schauble JF, Milier NR: Anemia and hypotension as contributors to perioperative loss of vision. *Anesthesiology* 1994; 80:222-6
3. Chalam KV, Shah VA: Severe bilateral posterior ischemic optic neuropathy as a complication of spinal surgery. *Eye* 2005; 19:367-8
4. Dunker S, Hsu HY, Sebag J, Sadun AA: Perioperative risk factors for posterior ischemic optic neuropathy. *Am Coll Surg* 2002; 194:705-10
5. Kamming D, Clarke S: Postoperative visual loss following prone spinal surgery. *Br J Anaesth* 2005; 95:257-60
6. Katz DM, Trobe JD, Cornblath WT, Kline LB: Ischemic optic neuropathy after lumbar spine surgery. *Arch Ophthalmol* 1994; 112:925-31
7. Lee LA, Lam AM: Unilateral blindness after prone lumbar spine surgery. *Anesthesiology* 2001; 95:793-5
8. Montero JA, Ruiz-Moreno JM, Galindo A, Fernandez-Muñoz M: Release hallucinations and visual loss as first manifestations of postoperative unilateral blindness. *Eur J Ophthalmol* 2007; 17:844-6
9. Murphy MA: Bilateral posterior ischemic optic neuropathy after lumbar spine surgery. *Ophthalmology* 2003; 110:1454-7
10. Roth S, Nunez R, Schreider BD: Unexplained visual loss after lumbar spinal fusion. *J Neurosurg Anesth* 1997; 9:346-8
11. Sys J, Michielsen J, Mertens S, Verstreken J, Tassignon MJ: Central retinal artery occlusion after spine surgery. *Eur Spine J* 1996; 5:74-5
12. Wolfe SW, Lospinuso MF, Burke SW: Unilateral blindness as a complication of patient positioning for spinal surgery. *Spine* 1992; 17:600-5

Intraoperative Blood Pressure Management: Deliberate hypotension techniques in high-risk patients (lengthy procedures or substantial BL) with preoperative chronic hypertension

Case reports or series

1. Dunker S, Hsu HY, Sebag J, Sadun AA: Perioperative risk factors for posterior ischemic optic neuropathy. *Am Coll Surg* 2002; 194:705-10
2. Lee AG: Ischemic optic neuropathy following lumbar spine surgery. Case report. *J Neurosurg* 1995; 83:348-9
3. Pin-On P, Boonsri S: Postoperative visual loss in orthopedic spine surgery in the prone position: a case report. *J Med Assoc Thai* 2015; 98:320-4
4. Ripart J, Desmots JM: Loss of vision after anaesthesia for nonophthalmic surgery: A persistent problem. *Eur J Anaesthesiol* 2009; 26:524-6
5. Roth S, Nunez R, Schreider BD: Unexplained visual loss after lumbar spinal fusion. *J Neurosurg Anesthesiol* 1997; 9:346-8
6. Stang-Veldhouse KN, Yeu E, Rothenberg DM, Mizen TR: Unusual presentation of perioperative ischemic optic neuropathy following major spine surgery. *J Clin Anesth* 2010; 22:52-5

Intraoperative Management of Blood Loss and Administration of Fluids: Periodic monitoring of hemoglobin or hematocrit levels

Case reports or series

1. Agarwal N, Hansberry DR, Goldstein IM: Cortical blindness following posterior lumbar decompression and fusion. *J Clin Neurosci* 2014; 21:155-9

Intraoperative Management of Blood Loss and Administration of Fluids: Colloid and crystalloid balance for fluid resuscitation

Observational studies or non-pertinent comparison groups

1. Lee LA, Roth S, Todd MM, Posner KL, Polissar NL, Neradilek MB, Torner J, Newman NJ, Domino KB, Lauer KK, Buddithi R, Gollapudy S, Pajewski TN, Scalzo DC, Avitsian R, Brown MJ, Buenvenida S, Mashour GA,

Moore LE, Samra SK, Lieberman J, Lane RK, Ramani R, Wagner J, Tempelhoff R, Monsey CM, Robicsek SA, Vu MM, Weeks J, Manninen PH, Fu ES, Sanchez-Yanes GC, Peterfreund RA, Albrecht MA, Sapire KJ, Baughman VL, Caplan RA, Cheney FW, Metzner J: Risk factors associated with ischemic optic neuropathy after spinal fusion surgery. *Anesthesiology* 2012; 116:15-24

Case reports or series

1. Bojinova RI, Konieczka K, Todorova MG: Unilateral loss of vision after spinal surgery in a patient with flammer syndrome. *Klin Monatsbl Augenheilkd* 2016; 233:429-31
2. Dilger JA, Tetzlaff JE, Bell GR, Kosmorsky GS, Agnor RC, O'Hara JF, Jr.: Ischaemic optic neuropathy after spinal fusion. *Can J Anaesth* 1998; 45:63-6
3. Kamming D, Clarke S: Postoperative visual loss following prone spinal surgery. *Br J Anaesth* 2005; 95:257-60
4. Kueper J, Loftus ML, Boachie-Adjei O, Lebl D: Posterior reversible encephalopathy syndrome: temporary visual loss after spinal deformity surgery. *Am J Orthop (Belle Mead NJ)* 2015; 44:E465-8
5. Mohan K, Rawall S, Nene A: Visual loss after spine surgery. *Indian J Orthopaed* 2012; 46:106-8
6. Nakra D, Bala I, Pratap M: Unilateral postoperative visual loss due to central retinal artery occlusion following cervical spine surgery in prone position. *Paediatr Anaesth* 2007; 17:805-8
7. Reddy A, Foroozan R, Edmond JC, Hinckley LK: Dilated superior ophthalmic veins and posterior ischemic optic neuropathy after prolonged spine surgery. *J Neuroophthalmol* 2008; 28:327-8

Intraoperative Management of Blood Loss and Administration of Fluids: Colloid versus crystalloid for fluid resuscitation and replacement

Case reports or series

1. Akpınar E, Okutan MO, Gürbüz MS, Bitirgen G: Unilateral vision loss without ophthalmoplegia as a rare complication of spinal surgery. *J Neurosci Rural Pract* 2017; 8:288-90
2. Brown RH, Schauble JF, Milier NR: Anemia and hypotension as contributors to perioperative loss of vision. *Anesthesiology* 1994; 80:222-6
3. Hassani V, Mohsen Homaei M, Mahdi Zamani M, Safari S, Nadi S, Shahbazi A, Alizadeh Zendeirood S, Rahimizadeh A, Hossein Lashkari M: Human erythropoietin effect in postoperative visual loss following spine surgery: a case report. *Anesthesiol Pain Med* 2014; 4:
4. Ibrahim TF, Sweis RT, Nockels RP: Reversible postoperative blindness caused by bilateral status epilepticus amauroticus following thoracolumbar deformity correction: case report. *J Neurosurg Spine* 2017; 27:63-7
5. Katz DA, Karlin LI: Visual field defect after posterior spine fusion. *Spine (Phila Pa 1976)* 2005; 30:E83-5
6. Katzman SS, Moschonas CG, Dzioba RB: Amaurosis secondary to massive blood loss after lumbar spine surgery. *Spine* 1994; 19:468-9
7. Kim JW, Hills WL, Rizzo JF, Egan RA, Lessell S: Ischemic optic neuropathy following spine surgery in a 16-year-old patient and a ten-year old patient. *J Neuroophthalmol* 2006; 26:30-33
8. Kueper J, Loftus ML, Boachie-Adjei O, Lebl D: Posterior reversible encephalopathy syndrome: temporary visual loss after spinal deformity surgery. *Am J Orthop (Belle Mead NJ)* 2015; 44:E465-8
9. Lee LA, Lam AM: Unilateral blindness after prone lumbar spine surgery. *Anesthesiology* 2001; 95:793-5
10. Murphy MA: Bilateral posterior ischemic optic neuropathy after lumbar spine surgery. *Ophthalmology* 2003; 110:1454-7
11. Quraishi NA, Wolinsky J-P, Gokaslan ZL: Transient bilateral post-operative visual loss in spinal surgery. *Eur Spine J* 2012; 21 Suppl 4:S495-S498
12. Roth S, Nunez R, Schreider BD: Unexplained visual loss after lumbar spinal fusion. *J Neurosurg Anesth* 1997; 9:346-8
13. Roth S, Tung A, Ksiazek S: Visual loss in a prone-positioned spine surgery patient with the head on a foam headrest and goggles covering the eyes: an old complication with a new mechanism. *Anesth Analg* 2007; 104:743-50
14. Samdani AF, Rutter L, Betz RR, Mulcahey MJ: Vision loss after spinal fusion for scoliosis in a child with spinal cord injury. *J Spinal Cord Med* 2009; 32:591-4
15. Stang-Veldhouse KN, Yeu E, Rothenberg DM, Mizen TR: Unusual presentation of perioperative ischemic optic neuropathy following major spine surgery. *J Clin Anesth* 2010; 22:52-5

16. Zimmerer S, Koehler M, Turtschi S, Palmowski-Wolfe A, Girard T: Amaurosis after spine surgery: survey of the literature and discussion of one case. *Eur Spine J* 2011; 20:171-6

Intraoperative Use of Vasopressors

Observational studies or non-pertinent comparison groups

1. Lee LA, Roth S, Todd MM, Posner KL, Polissar NL, Neradilek MB, Torner J, Newman NJ, Domino KB, Lauer KK, Buddithi R, Gollapudy S, Pajewski TN, Scalzo DC, Avitsian R, Brown MJ, Buenvenida S, Mashour GA, Moore LE, Samra SK, Lieberman J, Lane RK, Ramani R, Wagner J, Tempelhoff R, Monsey CM, Robicsek SA, Vu MM, Weeks J, Manninen PH, Fu ES, Sanchez-Yanes GC, Peterfreund RA, Albrecht MA, Sapire KJ, Baughman VL, Caplan RA, Cheney FW, Metzner J: Risk factors associated with ischemic optic neuropathy after spinal fusion surgery. *Anesthesiology* 2012; 116:15-24

Case reports or series

1. Zimmerer S, Koehler M, Turtschi S, Palmowski-Wolfe A, Girard T: Amaurosis after spine surgery: survey of the literature and discussion of one case. *Eur Spine J* 2011; 20:171-6

Intraoperative Patient and Head Positioning Devices: Direct pressure on the eye

Observational studies or non-pertinent comparison groups

1. Lee LA, Roth S, Posner KL, Cheney FW, Caplan RA, Newman NJ, Domino KB: The American Society of Anesthesiologists Postoperative Visual Loss Registry: Analysis of 93 spine surgery cases with postoperative visual loss. *Anesthesiology* 2006; 105:652-9
2. Lee LA, Roth S, Todd MM, Posner KL, Polissar NL, Neradilek MB, Torner J, Newman NJ, Domino KB, Lauer KK, Buddithi R, Gollapudy S, Pajewski TN, Scalzo DC, Avitsian R, Brown MJ, Buenvenida S, Mashour GA, Moore LE, Samra SK, Lieberman J, Lane RK, Ramani R, Wagner J, Tempelhoff R, Monsey CM, Robicsek SA, Vu MM, Weeks J, Manninen PH, Fu ES, Sanchez-Yanes GC, Peterfreund RA, Albrecht MA, Sapire KJ, Baughman VL, Caplan RA, Cheney FW, Metzner J: Risk factors associated with ischemic optic neuropathy after spinal fusion surgery. *Anesthesiology* 2012; 116:15-24
3. Shillingford JN, Laratta JL, Sarpong NO, Swindell H, Cerpa M, Lehman RA, Lenke LG, Fischer C: Visual loss following spine surgery: What have we seen within the scoliosis research society morbidity and mortality database? *Spine (Phila Pa 1976)* 2018; 43:1201-7

Case reports or series

1. Amorim Correa JL, Acioly MA: The enigma of orbital compartment syndrome after lumbar spine surgery in the prone position: Case report and literature review. *World Neurosurg* 2018; 110:309-14
2. Bekar A, Tureyen K, Aksoy K: Unilateral blindness due to patient positioning during cervical syringomyelia surgery: Unilateral blindness after prone position. *J Neurosurg Anesthesiol* 1996; 8:227-9
3. Grossman W, Ward WT: Central retinal artery occlusion after scoliosis surgery with a horseshoe headrest. Case report and literature review. *Spine (Phila Pa 1976)* 1993; 18:1226-8
4. Hoski JJ, Eismont FJ, Green BA: Blindness as a complication of intraoperative positioning. A case report. *J Bone Joint Surg Am* 1993; 75:1231-2
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17. Sys J, Michielsen J, Mertens E, Verstreken J, Tassignon MJ: Central retinal artery occlusion after spinal surgery. *Eur Spine J* 1996; 5:74-5
18. Wolfe SW, Lospinuso MF, Burke SW: Unilateral blindness as a complication of patient positioning for spinal surgery. A case report. *Spine (Phila Pa 1976)* 1992; 17:600-5
19. Yu YH, Chen WJ, Chen LH, Chen WC: Ischemic orbital compartment syndrome after posterior spinal surgery. *Spine (Phila Pa 1976)* 2008; 33:E569-72

Intraoperative Patient and Head Positioning Devices: Avoidance of direct pressure on the eye (e.g., headrests, sheet rolls, other equipment)

Observational studies or non-pertinent comparison groups

1. Lee LA, Roth S, Posner KL, Cheney FW, Caplan RA, Newman NJ, Domino KB: The American Society of Anesthesiologists Postoperative Visual Loss Registry: Analysis of 93 spine surgery cases with postoperative visual loss. *Anesthesiology* 2006; 105:652-9
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3. Shillingford JN, Laratta JL, Sarpong NO, Swindell H, Cerpa M, Lehman RA, Lenke LG, Fischer C: Visual loss following spine surgery: What have we seen within the scoliosis research society morbidity and mortality database? *Spine (Phila Pa 1976)* 2018; 43:1201-7

Case reports or series

1. Akpınar E, Okutan MO, Gürbüz MS, Bitirgen G: Unilateral vision loss without ophthalmoplegia as a rare complication of spinal surgery. *J Neurosci Rural Pract* 2017; 8:288-90
2. Mishra RK, Mahajan C, Bindra A, Goyal K: Postoperative visual loss following dorsal root entry zone rhizotomy: a dreaded complication after a benign procedure. *Saudi J Anaesth* 2016; 10:449-52
3. Mohan K, Rawall S, Nene A: Visual loss after spine surgery. *Indian J Orthopaed* 2012; 46:106-8
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Intraoperative Patient and Head Positioning Devices: Positioning of head level with or higher than the heart in high-risk patients

No Entries

Intraoperative Patient and Head Positioning Devices: Placing head in a neutral forward position in high-risk patients

No Entries

Intraoperative Patient and Head Positioning Devices: Regular assessment and documentation of the eyes of prone-positioned patients

Case reports or series

1. Brown RH, Schauble JF, Milier NR: Anemia and hypotension as contributors to perioperative loss of vision. *Anesthesiology* 1994; 80:222-6
2. Lee LA, Lam AM: Unilateral blindness after prone lumbar spine surgery. *Anesthesiology* 2001; 95:793-5
3. Roth S, Nunez R, Schreider BD: Unexplained visual loss after lumbar spinal fusion. *J Neurosurg Anesth* 1997; 9:346-8

Intraoperative Patient and Head Positioning Devices: Occurrence of perioperative facial edema in high-risk patients

Observational studies or non-pertinent comparison groups

1. Shillingford JN, Laratta JL, Sarpong NO, Swindell H, Cerpa M, Lehman RA, Lenke LG, Fischer C: Visual loss following spine surgery: What have we seen within the scoliosis research society morbidity and mortality database? *Spine (Phila Pa 1976)* 2018; 43:1201-7

Case reports or series

1. Amorim Correa JL, Acioly MA: The enigma of orbital compartment syndrome after lumbar spine surgery in the prone position: case report and literature review. *World Neurosurg* 2018; 110:309-14
2. Alexandrakis G, Lam BL: Bilateral posterior ischemic optic neuropath after spinal surgery. *Am J Ophthalmol* 1999; 127:354-5
3. Bekar A, Tureyen K, Aksoy K: Unilateral blindness due to patient positioning during cervical syringomyelia surgery: unilateral blindness after prone position. *J Neurosurg Anesth* 1996; 8:227-9
4. Chung MS, Son JH: Visual loss in one eye after spinal surgery. *Korean J Ophthalmol* 2006; 20:139-42
5. Dilger JA, Tetzlaff, JE, Bell GR, Kosmorsky GS, Agnor RC, O'Hara JF: Ischaemic optic neuropathy after spinal fusion. *Can J Anaesth* 1998; 45:63-6
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8. Hoski JJ, Eismont FJ, Green BA: Blindness as a complication of intraoperative positioning. *J Bone Joint Surg* 1993; 75:1231-2
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10. Lee SH, Chung I, Choi DS, Shin IW, Kim S, Kang S, Kim JY, Chung YK, Sohn JT: Visual loss due to optic nerve infarction and central retinal artery occlusion after spine surgery in the prone position: A case report. *Medicine (Baltimore)* 2017; 96:e7379
11. Roth S, Nunez R, Schreider BD: Unexplained visual loss after lumbar spinal fusion. *J Neurosurg Anesth* 1997; 9:346-8
12. Kim JW, Hills WL, Rizzo JF, Egan RA, Lessell S: Ischemic optic neuropathy following spine surgery in a 16-year-old patient and a ten-year old patient. *J Neuroophthalmol* 2006; 26:30-3
13. Lee LA, Lam AM: Unilateral blindness after prone lumbar spine surgery. *Anesthesiology* 2001; 95:793-95
14. Leibovitch I, Sasson R, Laforest C, Selva D: Ischaemic orbital compartment syndrome as a complication of spinal surgery in the prone position. *Ophthalmology* 2006; 113:105-8
15. Locastro A, Novak KD, Biglan AW: Central retinal artery occlusion in child after general anesthesia. *Am J Ophthalmol* 1991; 112:91-2
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17. Murphy MA: Bilateral posterior ischemic optic neuropathy after lumbar spine surgery. *Ophthalmology* 2003; 110:1454-7

18. Nakra D, Bala I, Pratap M: Unilateral postoperative visual loss due to central retinal artery occlusion following cervical spine surgery in prone position. *Paediatr Anaesth* 2007; 17:805-8
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Intraoperative Patient and Head Positioning Devices: Staging of surgical procedures

No Entries

Postoperative Mangement: Assessing a high-risk patient's vision when the patient becomes alert

No Entries

Postoperative Mangement: MR imaging

No Entries

Postoperative Mangement: Adjusting hemoglobin or hematocrit levels upward in patients for whom ION is suspected

Observational studies or non-pertinent comparison groups

1. Stevens WR, Glazer PA, Kelley SSD, Leitman TM, Bradford DS: Ophthalmologic complications after spinal surgery. *Spine* 1997; 22:1319-4

Postoperative Mangement: Adjusting hemoglobin or hematocrit levels upward in patients for whom ION is suspected

Observational studies or non-pertinent comparison groups

1. Stevens WR, Glazer PA, Kelley SSD, Leitman TM, Bradford DS: Ophthalmologic complications after spinal surgery. *Spine* 1997; 22:1319-4

Postoperative Mangement: Administering arterial oxygenation in patients for whom ION is suspected

No Entries

Postoperative Mangement: Adjusting hemoglobin or hematocrit levels upward in patients for whom ION is suspected

Case reports or series

1. Bekar A, Tureyen K, Aksoy K: Unilateral blindness due to patient positioning during cervical syringomyelia surgery: Unilateral blindness after prone position. *J Neurosurg Anesthesiol* 1996; 8:227-9
2. Bradish CF, Flowers M: Central retinal artery occlusion in association with osteogenesis imperfecta. *Spine (Phila Pa 1976)* 1987; 12:193-4
3. Chalam KV, Shah VA: Severe bilateral posterior ischemic optic neuropathy as a complication of spinal surgery. *Eye (Lond)* 2005; 19:367-8
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13. Roth S, Nunez R, Schreider BD: Unexplained visual loss after lumbar spinal fusion. *J Neurosurg Anesthesiol* 1997; 9:346-8
14. Shifa J, Abebe W, Bekele N, Habte D: A case of bilateral visual loss after spinal cord surgery. *Pan Afr Med J* 2016; 23:119
15. Yu YH, Chen WJ, Chen LH, Chen WC: Ischemic orbital compartment syndrome after posterior spinal surgery. *Spine (Phila Pa 1976)* 2008; 33:E569-72
16. Zimmerer S, Koehler M, Turtschi S, Palmowski-Wolfe A, Girard T: Amaurosis after spine surgery: survey of the literature and discussion of one case. *Eur Spine J* 2011; 20:171-6