

Blunt chest trauma

20% of patients with a major [spine injury](#) will have a second spinal injury at another level, which may be noncontiguous. These patients often have simultaneous but unrelated injuries (e.g. chest trauma, TBI...). Injuries directly associated with spinal cord injuries include arterial dissections (carotid and/or vertebral arteries).

Possible etiology of [Horner's syndrome](#), [Hyperprolactinemia](#), usually $\leq 50\text{ng/ml}$.

In some cases of [Shaken baby syndrome](#) there may be finger marks on the chest, multiple rib fractures and/or pulmonary compression $\pm$ parenchymal lung hemorrhage. Deaths in these cases are almost all due to uncontrollable intracranial hypertension.

[Purtscher's retinopathy](#): [Loss of vision](#) ¹⁾ following [major trauma](#) (chest crush injuries, airbag deployment ²⁾ ...), pancreatitis, childbirth or renal failure, among others. Posterior pole ischemia with cotton-wool exudates and hemorrhages around the [optic disc](#) due to microemboli of possibly fat, air, fibrin clots, complement-mediated aggregates or platelet clumps. No known treatment.

Blunt chest wall injuries are a significant cause of mortality and morbidity in trauma patients. Accurate identification and description of chest wall injuries by the radiologist can aid in guiding proper patient management. The American Association for the Surgery of Trauma (AAST) has devised a classification system based on severity.

A article of Marro et al., described the features of each injury grade according to the AAST injury scale and discusses the implications for management. Additionally, common mechanisms of blunt chest trauma and multimodal imaging techniques are discussed ³⁾.

Unclassified

1: Marro A, Chan V, Haas B, Ditkofsky N. Blunt chest trauma: classification and management. Emerg Radiol. 2019 Jul 6. doi: 10.1007/s10140-019-01705-z. [Epub ahead of print] PubMed PMID: 31280427.

2: Petekkaya S, Celbiş O, Oner BS, Turan Ö, Yener Z. A rare case of fatal venous and cerebral air embolism. Ulus Travma Acil Cerrahi Derg. 2019 May;25(3):311-315. doi: 10.5505/tjtes.2018.58201. PubMed PMID: 31135947.

3: Malgras B, Aoun O, Pauleau G, Boddaert G, Hornez E, Dulou R, Delmas JM, Haen P, Laversanne S, Crambert A, Balandraud P. Deployment of the Surgical Life-saving Module (SLM) in 2017: Lessons learned in setting up and training operational surgical units. Injury. 2019 May;50(5):1133-1137. doi: 10.1016/j.injury.2019.03.001. Epub 2019 Mar 4. PubMed PMID: 30851979.

- 4: Liao CA, Wu YT, Liao CH, Wang SY, Fu CY, Hsieh CH, Chen SW, Chen CC, Chou AH, Cheng CT. Hospital level variations in the trends and outcomes of the nonoperative management of splenic injuries - a nationwide cohort study. *Scand J Trauma Resusc Emerg Med*. 2019 Jan 11;27(1):4. doi: 10.1186/s13049-018-0578-y. PubMed PMID: 30635015; PubMed Central PMCID: PMC6329069.
- 5: O'Toole JE, Kaiser MG, Anderson PA, Arnold PM, Chi JH, Dailey AT, Dhall SS, Eichholz KM, Harrop JS, Hoh DJ, Qureshi S, Rabb CH, Raksin PB. Congress of Neurological Surgeons Systematic Review and Evidence-Based Guidelines on the Evaluation and Treatment of Patients with Thoracolumbar Spine Trauma: Executive Summary. *Neurosurgery*. 2019 Jan 1;84(1):2-6. doi: 10.1093/neuros/nyy394. PubMed PMID: 30202985.
- 6: Yamaoka A, Miyata K, Bunya N, Mizuno H, Irifune H, Yama N, Akiyama Y, Mikami T, Wanibuchi M, Mikuni N. Traumatic Basilar Artery Entrapment without Longitudinal Clivus Fracture: A Case Report and Review of the Literature. *Neurol Med Chir (Tokyo)*. 2018 Aug 15;58(8):362-367. doi: 10.2176/nmc.cr.2018-0041. Epub 2018 Jun 20. Review. PubMed PMID: 29925721; PubMed Central PMCID: PMC6092608.
- 7: Santoro G, Ramieri A, Chiarella V, Vigliotta M, Domenicucci M. Thoraco-lumbar fractures with blunt traumatic aortic injury in adult patients: correlations and management. *Eur Spine J*. 2018 Jun;27(Suppl 2):248-257. doi: 10.1007/s00586-018-5601-5. Epub 2018 Apr 16. PubMed PMID: 29663146.
- 8: Kovari VZ, Pecsí F, Cs Janvari M, Veres R. Initial experience with the treatment of concomitant aortic pseudoaneurysm and thoracolumbar spinal fracture: Case report. *Trauma Case Rep*. 2017 Nov 6;12:48-53. doi: 10.1016/j.tcr.2017.10.019. eCollection 2017 Dec. PubMed PMID: 29644285; PubMed Central PMCID: PMC5887094.
- 9: Eschbach D, Horst K, Sassen M, Andruszkow J, Mohr J, Debus F, Vogt N, Steinfeldt T, Hildebrand F, Schöller K, Uhl E, Wulf H, Ruchholtz S, Pape H, Frink M. Hypothermia does not influence liver damage and function in a porcine polytrauma model. *Technol Healthcare*. 2018;26(2):209-221. doi: 10.3233/THC-171043. PubMed PMID: 28968251.
- 10: Foreman PM, Harrigan MR. Blunt Traumatic Extracranial Cerebrovascular Injury and Ischemic Stroke. *Cerebrovasc Dis Extra*. 2017;7(1):72-83. doi: 10.1159/000455391. Epub 2017 Apr 11. Review. PubMed PMID: 28399527; PubMed Central PMCID: PMC5425764.
- 11: Ren J, Zeng G, Ma YJ, Chen N, Chen Z, Ling F, Zhang HQ. Pediatric thoracic SCIWORA after back bend during dance practice: a retrospective case series and analysis of trauma mechanisms. *Childs Nerv Syst*. 2017 Jul;33(7):1191-1198. doi: 10.1007/s00381-017-3407-0. Epub 2017 Apr 4. PubMed PMID: 28378287.
- 12: Decramer T, Van Dyck-Lippens PJ, Franken TP, Demaerel P, van Loon J, Theys T. A Small Leak Will Sink the Brain: Targeted C1-C2 Patching. *World Neurosurg*. 2017 May;101:816.e1-816.e3. doi: 10.1016/j.wneu.2017.02.086. Epub 2017 Feb 27. PubMed PMID: 28254591.
- 13: Inoue T, Abe M. Esophageal perforation associated with fracture of the upper thoracic spine from blunt trauma: a case report. *Spinal Cord Ser Cases*. 2016 Apr 7;2:15034. doi: 10.1038/scsandc.2015.34. eCollection 2016. Erratum in: *Spinal Cord Ser Cases*. 2016 Jul 21;2:16019. PubMed PMID: 28053736; PubMed Central PMCID: PMC5129432.
- 14: Kasotakis G, Hasenboehler EA, Streib EW, Patel N, Patel MB, Alarcon L, Bosarge PL, Love J, Haut ER, Como JJ. Operative fixation of rib fractures after blunt trauma: A practice management guideline from the Eastern Association for the Surgery of Trauma. *J Trauma Acute Care Surg*. 2017 Mar;82(3):618-626. doi: 10.1097/TA.0000000000001350. PubMed PMID: 28030502.

- 15: Esnault P, Cardinale M, Boret H, D'Aranda E, Montcriol A, Bordes J, Prunet B, Joubert C, Dagain A, Goutorbe P, Kaiser E, Meaudre E. Blunt cerebrovascular injuries in severe traumatic brain injury: incidence, risk factors, and evolution. *J Neurosurg*. 2017 Jul;127(1):16-22. doi: 10.3171/2016.4.JNS152600. Epub 2016 Jul 29. PubMed PMID: 27471889.
- 16: Moore JM, Thomas PA, Gruen RL, Chan P, Rosenfeld JV. Simultaneous multisystem surgery: An important capability for the civilian trauma hospital. *Clin Neurol Neurosurg*. 2016 Sep;148:13-6. doi: 10.1016/j.clineuro.2016.06.012. Epub 2016 Jun 16. Review. Erratum in: *Clin Neurol Neurosurg*. 2016 Dec;151:145. Rosenfeld JV [corrected to Rosenfeld JV]. PubMed PMID: 27359088.
- 17: O'Phelan KH, Merenda A, Denny KG, Zaila KE, Gonzalez C. Therapeutic temperature modulation is associated with pulmonary complications in patients with severe traumatic brain injury. *World J Crit Care Med*. 2015 Nov 4;4(4):296-301. doi: 10.5492/wjccm.v4.i4.296. eCollection 2015 Nov 4. PubMed PMID: 26557480; PubMed Central PMCID: PMC4631875.
- 18: Gulbahar G, Kaplan T, Gundogdu AG, Baran HN, Kazanci B, Kocer B, Han S. A Rare and Serious Syndrome That Requires Attention in Emergency Service: Traumatic Asphyxia. *Case Rep Emerg Med*. 2015;2015:359814. doi: 10.1155/2015/359814. Epub 2015 May 24. PubMed PMID: 26090242; PubMed Central PMCID: PMC4458292.
- 19: Stephan K, Huber S, Häberle S, Kanz KG, Bühren V, van Griensven M, Meyer B, Biberthaler P, Lefering R, Huber-Wagner S; TraumaRegister DGU. Spinal cord injury-incidence, prognosis, and outcome: an analysis of the TraumaRegister DGU. *Spine J*. 2015 Sep 1;15(9):1994-2001. doi: 10.1016/j.spinee.2015.04.041. Epub 2015 May 2. PubMed PMID: 25939671.
- 20: Søvik S, Skaga NO, Hanaa R, Eken T. Sudden survival improvement in critical neurotrauma: An exploratory analysis using a stratified statistical process control technique. *Injury*. 2014 Nov;45(11):1722-30. doi: 10.1016/j.injury.2014.05.038. Epub 2014 Jul 9. PubMed PMID: 25059506.
- 21: Boybeyi O, Bakar B, Aslan MK, Atasoy P, Kisa U, Soyer T. Evaluation of dimethyl sulfoxide and dexamethasone on pulmonary contusion in experimental blunt thoracic trauma. *Thorac Cardiovasc Surg*. 2014 Dec;62(8):710-5. doi: 10.1055/s-0033-1352591. Epub 2013 Aug 12. PubMed PMID: 23939657.
- 22: Yadav S, Jain S, Aggarwal P, Gupta R. Systemic arterial air embolism: positive pressure ventilation can be fatal in a patient with blunt trauma. *BMJ Case Rep*. 2013 Feb 15;2013. pii: bcr2012008343. doi: 10.1136/bcr-2012-008343. PubMed PMID: 23417941; PubMed Central PMCID: PMC3604208.
- 23: Engel AJ. Utility of intercostal nerve conventional thermal radiofrequency ablations in the injured worker after blunt trauma. *Pain Physician*. 2012 Sep-Oct;15(5):E711-8. PubMed PMID: 22996865.
- 24: Aarabi B, Harrop JS, Tator CH, Alexander M, Dettori JR, Grossman RG, Fehlings MG, Mirvis SE, Shanmuganathan K, Zacherl KM, Burau KD, Frankowski RF, Toups E, Shaffrey CI, Guest JD, Harkema SJ, Habashi NM, Andrews P, Johnson MM, Rosner MK. Predictors of pulmonary complications in blunt traumatic spinal cord injury. *J Neurosurg Spine*. 2012 Sep;17(1 Suppl):38-45. doi: 10.3171/2012.4.AOSpine1295. PubMed PMID: 22985369.
- 25: Lee JH, Streijger F, Tigchelaar S, Maloon M, Liu J, Tetzlaff W, Kwon BK. A contusive model of unilateral cervical spinal cord injury using the infinite horizon impactor. *J Vis Exp*. 2012 Jul 24;(65). pii: 3313. doi: 10.3791/3313. PubMed PMID: 22871686; PubMed Central PMCID: PMC3479980.
- 26: Matsukawa H, Shinoda M, Fujii M, Takahashi O, Murakata A, Yamamoto D, Sumiyoshi S, Ishikawa R. Intraventricular hemorrhage on computed tomography and corpus callosum injury on magnetic

- resonance imaging in patients with isolated blunt traumatic brain injury. *J Neurosurg.* 2012 Aug;117(2):334-9. doi: 10.3171/2012.5.JNS112318. Epub 2012 Jun 15. PubMed PMID: 22702486.
- 27: Truitt MS, Murry J, Amos J, Lorenzo M, Mangram A, Dunn E, Moore EE. Continuous intercostal nerve blockade for rib fractures: ready for primetime? *J Trauma.* 2011 Dec;71(6):1548-52; discussion 1552. doi: 10.1097/TA.0b013e31823c96e0. PubMed PMID: 22182865.
- 28: Paiva WS, Oliveira AM, Andrade AF, Amorim RL, Lourenço LJ, Teixeira MJ. Spinal cord injury and its association with blunt head trauma. *Int J Gen Med.* 2011;4:613-5. doi: 10.2147/IJGM.S15811. Epub 2011 Sep 5. PubMed PMID: 21941446; PubMed Central PMCID: PMC3177586.
- 29: Lin YL, Yu CH. Acute myocardial infarction caused by coronary artery dissection after a blunt chest trauma. *Intern Med.* 2011;50(18):1969-71. Epub 2011 Sep 15. PubMed PMID: 21921378.
- 30: Gilani R, Ochoa L, Wall MJ Jr, Tsai PI, Mattox KL. Endovascular repair of traumatic aortic injury using a custom fenestrated endograft to preserve the left subclavian artery. *Vasc Endovascular Surg.* 2011 Aug;45(6):549-52. doi: 10.1177/1538574411413939. Epub 2011 Jun 29. PubMed PMID: 21715420.
- 31: Yoganandan N, Stemper BD, Pintar FA, Maiman DJ. Use of postmortem human subjects to describe injury responses and tolerances. *Clin Anat.* 2011 Apr;24(3):282-93. doi: 10.1002/ca.21106. Epub 2011 Jan 3. PubMed PMID: 21433078.
- 32: Domenicucci M, Ramieri A, Landi A, Melone AG, Raco A, Ruggiero M, Speziale F. Blunt abdominal aortic disruption (BAAD) in shear fracture of the adult thoraco-lumbar spine: case report and literature review. *Eur Spine J.* 2011 Jul;20 Suppl 2:S314-9. doi: 10.1007/s00586-011-1732-7. Epub 2011 Mar 6. Review. PubMed PMID: 21380748; PubMed Central PMCID: PMC3111528.
- 33: Fusco MR, Harrigan MR. Cerebrovascular dissections: a review. Part II: blunt cerebrovascular injury. *Neurosurgery.* 2011 Feb;68(2):517-30; discussion 530. doi: 10.1227/NEU.0b013e3181fe2fda. Review. PubMed PMID: 21135751.
- 34: Truitt MS, Mooty RC, Amos J, Lorenzo M, Mangram A, Dunn E. Out with the old, in with the new: a novel approach to treating pain associated with rib fractures. *World J Surg.* 2010 Oct;34(10):2359-62. doi: 10.1007/s00268-010-0651-9. PubMed PMID: 20567973.
- 35: Baron RD, Pal D, Crimmins DW, Dexter SP. Spinal Epidural Abscess Presenting with Paraplegia Following Delayed Presentation of Traumatic Esophageal Perforation without Spinal Fracture: Lessons to be Learnt. *Eur J Trauma Emerg Surg.* 2010 Jun;36(3):247-9. doi: 10.1007/s00068-009-8225-y. Epub 2009 Jun 19. PubMed PMID: 26815868.
- 36: Jang JW, Lee JK, Seo BR, Kim JH, Kim SH. Spontaneous resolution of a traumatic cervicothoracic epidural hematoma presenting with transient paraplegia: a case report. *Spine (Phila Pa 1976).* 2010 May 20;35(12):E564-7. doi: 10.1097/BRS.0b013e3181cd2de8. PubMed PMID: 20445476.
- 37: Papadakos PJ, Karcz M, Lachmann B. Mechanical ventilation in trauma. *Curr Opin Anaesthesiol.* 2010 Apr;23(2):228-32. doi: 10.1097/ACO.0b013e328336ea6e. Review. PubMed PMID: 20071980.
- 38: Saltzherr TP, Beenen LF, Reitsma JB, Luitse JS, Vandertop WP, Goslings JC. Frequent computed tomography scanning due to incomplete three-view X-ray imaging of the cervical spine. *J Trauma.* 2010 May;68(5):1213-7. doi: 10.1097/TA.0b013e3181b28aa4. PubMed PMID: 20016389.
- 39: Ringer AJ, Matern E, Parikh S, Levine NB. Screening for blunt cerebrovascular injury: selection

criteria for use of angiography. *J Neurosurg.* 2010 May;112(5):1146-9. doi: 10.3171/2009.6.JNS08416. Review. PubMed PMID: 19645535.

40: Ruiz-Gimeno JI, Femenía F, Ausina A, Barberá M. [Acute myocardial infarction as an incidental finding: reflections on the preanesthesia evaluation]. *Rev Esp Anesthesiol Reanim.* 2009 May;56(5):315-8. Spanish. PubMed PMID: 19580135.

41: Fukai J, Tsujimoto T, Yoshimura R, Raimura M, Kuwata T, Hyotani G, Yabumoto M, Itakura T, Kamei I. Timing of craniotomy in a patient with multiple trauma including head injury. *Neurol Med Chir (Tokyo).* 2009 Jan;49(1):22-5. PubMed PMID: 19168998.

42: Stemper BD, Yoganandan N, Pintar FA, Brasel KJ. Multiple subfailures characterize blunt aortic injury. *J Trauma.* 2007 May;62(5):1171-4. PubMed PMID: 17495720.

43: Robles LA. Traumatic spinal cord infarction in a child: case report and review of literature. *Surg Neurol.* 2007 May;67(5):529-34. PubMed PMID: 17445627.

44: Stemper BD, Yoganandan N, Sinson GP, Gennarelli TA, Stineman MR, Pintar FA. Biomechanical characterization of internal layer subfailure in blunt arterial injury. *Ann Biomed Eng.* 2007 Feb;35(2):285-91. Epub 2006 Dec 7. PubMed PMID: 17151920.

45: Kreichati GE, Kassab FN, Kharrat KE. Herniated intervertebral disc associated with a lumbar spine dislocation as a cause of cauda equina syndrome: a case report. *Eur Spine J.* 2006 Jun;15(6):1015-8. Epub 2006 Apr 14. PubMed PMID: 16614853; PubMed Central PMCID: PMC3489452.

46: Rahimi-Movaghar V, Vaccaro AR, Mohammadi M. Efficacy of surgical decompression in regard to motor recovery in the setting of conus medullaris injury. *J Spinal Cord Med.* 2006;29(1):32-8. PubMed PMID: 16572563; PubMed Central PMCID: PMC1864791.

47: Simon BJ, Cushman J, Barraco R, Lane V, Luchette FA, Miglietta M, Roccaforte DJ, Spector R; EAST Practice Management Guidelines Work Group. Pain management guidelines for blunt thoracic trauma. *J Trauma.* 2005 Nov;59(5):1256-67. PubMed PMID: 16385313.

48: Bochicchio GV, Salzano L, Joshi M, Bochicchio K, Scalea TM. Admission preoperative glucose is predictive of morbidity and mortality in trauma patients who require immediate operative intervention. *Am Surg.* 2005 Feb;71(2):171-4. PubMed PMID: 16022019.

49: Lifshutz J, Lidar Z, Maiman D. Thoracic aortic pseudoaneurysm after spine trauma in ankylosing spondylitis. Case report. *J Neurosurg Spine.* 2005 Feb;2(2):218-21. PubMed PMID: 15739538.

50: Cuenca PJ, Tulley EB, Devita D, Stone A. Delayed traumatic spinal epidural hematoma with spontaneous resolution of symptoms. *J Emerg Med.* 2004 Jul;27(1):37-41. PubMed PMID: 15219302.

51: Haberbeck Modesto MA. Anatomic and functional digital subtraction periangiography of the brachial plexus, its terminal branches, and the carotid sheath. *Neuroimaging Clin N Am.* 2004 Feb;14(1):87-92, viii. PubMed PMID: 15177258.

52: Kim DH, Murovic JA, Tiel RL, Kline DG. Mechanisms of injury in operative brachial plexus lesions. *Neurosurg Focus.* 2004 May 15;16(5):E2. Review. PubMed PMID: 15174822.

53: Lijie T, Zhenglang X, Xu W, Xu J, Gu Y. Mobilization of the phrenic nerve in the thoracic cavity by video-assisted thoracic surgery. Techniques and initial experience. *Surg Endosc.* 2001 Oct;15(10):1156-8. Erratum in: *Surg Endosc.* 2003 Jul;17(7):1165. Xu, W [added]; Xu, J [added]; Gu, Y

[added]. PubMed PMID: 11727091.

54: Lew SM, Frumiento C, Wald SL. Pediatric blunt carotid injury: a review of the National Pediatric Trauma Registry. *Pediatr Neurosurg*. 1999 May;30(5):239-44. Review. PubMed PMID: 10461070.

55: Prall JA, Brega KE, Coldwell DM, Breeze RE. Incidence of unsuspected blunt carotid artery injury. *Neurosurgery*. 1998 Mar;42(3):495-8; discussion 498-9. PubMed PMID: 9526983.

56: Franchello A, Olivero G, Di Summa M, Memore L, Scavarda B, Bertoldo U. Rupture of thoracic aorta resulting from blunt trauma. *Int Surg*. 1997 Jan-Mar;82(1):79-84. PubMed PMID: 9189810.

57: Merry WH, Cogbill TH, Annis BL, Lambert PJ. Functional outcome after incomplete spinal cord injuries due to blunt injury. *Injury*. 1996 Jan;27(1):17-20. PubMed PMID: 8746310.

58: Winchell RJ, Hoyt DB, Simons RK. Use of computed tomography of the head in the hypotensive blunt-trauma patient. *Ann Emerg Med*. 1995 Jun;25(6):737-42. PubMed PMID: 7755193.

59: Haenel JB, Moore FA, Moore EE, Sauaia A, Read RA, Burch JM. Extrapleural bupivacaine for amelioration of multiple rib fracture pain. *J Trauma*. 1995 Jan;38(1):22-7. PubMed PMID: 7745650.

60: Thomason M, Messick J, Rutledge R, Meredith W, Reeves TR, Cunningham P, Oller D, Moylan J, Clancy T, Baker C. Head CT scanning versus urgent exploration in the hypotensive blunt trauma patient. *J Trauma*. 1993 Jan;34(1):40-4; discussion 44-5. PubMed PMID: 8437194.

61: Nussbaum ES, Sebring LA, Wolf AL, Mirvis SE, Gottlieb R. Myelographic and enhanced computed tomographic appearance of acute traumatic spinal cord avulsion. *Neurosurgery*. 1992 Jan;30(1):43-8. PubMed PMID: 1738454.

62: Salerni AA, Kuivila TE, Drvaric DM, Deutsch SD, Knuckey NW. Traumatic subarachnoid-pleural fistula in a child. A case report. *Clin Orthop Relat Res*. 1991 Mar;(264):184-8. PubMed PMID: 1997234.

63: Onishi H, Ito H, Ikeda K, Higashi S, Hayase H, Toma Y. [Cerebral artery occlusion due to blunt cervical trauma]. *No Shinkei Geka*. 1989 Jun;17(6):579-84. Japanese. PubMed PMID: 2615907.

64: Sutherland GR, Sibbald WJ. Blunt traumatic myocardial injury. *Crit Care Clin*. 1985 Nov;1(3):663-75. Review. PubMed PMID: 3916798.

1)

Buckley SA, James B. Purtscher's retinopathy. *Post-grad Med J*. 1996; 72:409-412

2)

Shah GK, Penne R, Grand MG. Purtscher's retinopathy secondary to airbag injury. *Retina*. 2001; 21:68-69

3)

Marro A, Chan V, Haas B, Ditkofsky N. Blunt chest trauma: classification and management. *Emerg Radiol*. 2019 Jul 6. doi: 10.1007/s10140-019-01705-z. [Epub ahead of print] PubMed PMID: 31280427.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

https://neurosurgerywiki.com/wiki/doku.php?id=blunt_chest_trauma

Last update: **2024/06/07 02:53**



