Surgical site infection in spine surgery

- Clinical outcomes of posterior cervical fusion in the setting of increasing age and medical complexity: an American national database analysis from 2012 to 2022
- Assessing malnutrition in cerebral palsy patients and its impact on complications following spinal fusion
- Letter to the editor: 'Vancomycin Antibiotic Prophylaxis Compared to Cefazolin Increases Risk of Surgical Site Infection Following Spine Surgery' by Brandon J. Herrington et al
- Letter to the Editor Regarding "Vancomycin Antibiotic Prophylaxis Compared to Cefazolin Increases Risk of Surgical Site Infection Following Spine Surgery"
- Affordable Irrigation-Drainage System for Early Postoperative Adhesion and Surgical Site Infection Prophylaxis in Posterior Lumbar Surgery: A Technical Note
- Aspergillus terreus Fungal Spondylodiscitis in a Healthy Patient Post-Lumbar Spine Surgery: A Rare Case Report
- Outcomes following single level posterior lumbar fusion in patients with systemic and discoid lupus: A retrospective national database study
- A meta-analysis of the efficacy of topical antibiotics in spinal surgery for the prevention of surgical site infection

see Spinal infection.

see also Spinal instrumentation infection.

Surgical site infections (SSI) are common spine surgery complications.

Most descriptions of spine surgery morbidity and mortality in the literature are retrospective. Emerging prospective analyses of adverse events (AEs) demonstrate significantly higher rates, suggesting underreporting in retrospective and prospective studies that do not include AEs as a targeted outcome.

Major spinal surgery in adult patients is often associated with significant intraoperative blood loss.

In spine surgery, the incidence of postoperative wound infection is 0.7 to 16% [1) 2)].

Although incidence rates are low, adverse events of spinal procedures substantially increase the cost of care. Charges for patients experiencing Deep venous thrombosis (Deep-vein thrombosis), PE, and surgical site infection (SSI) increased in a study by factors ranging from 1.8 to 4.3 times those for patients without such complications across 5 common spinal and orthopedic procedures. Cost projections by health care providers will need to incorporate expected costs of added care for patients experiencing such complications, assuming that the cost burden of such events continues to shift from payers to providers [3)].

Surgical site infections are a major driver of morbidity and increased costs in the postoperative period after spine surgery. Current tools for surveillance of these adverse events rely on prospective clinical

tracking, manual retrospective chart review, or administrative procedural and diagnosis codes.

The purpose of a study was to develop natural language processing (NLP) algorithms for automated reporting of postoperative wound infection requiring reoperation after lumbar discectomy.

Adult patients undergoing discectomy at two academic and three community medical centers between January 1st, 2000 and July 31st, 2019 for lumbar disc herniation.

Reoperation for wound infection within 90-days after surgery METHODS: Free-text notes of patients who underwent surgery from January 1st, 2000 to December 31st, 2015 were used for algorithm training. Free-text notes of patients who underwent surgery after January 1st, 2016 were used for algorithm testing. Manual chart review was used to label which patients had reoperation for wound infection. An extreme gradient-boosting NLP algorithm was developed to detect reoperation for postoperative wound infection.

Overall, 5860 patients were included in this study and 62 (1.1%) had a reoperation for wound infection. In patients who underwent surgery after January 1st, 2016 (n = 1377), the NLP algorithm detected 15 of the 16 patients (sensitivity = 0.94) who had reoperation for infection. In comparison, current procedural terminology (CPT) and international classification of disease (ICD) codes detected 12 of these 16 patients (sensitivity = 0.75). At a threshold of 0.05, the NLP algorithm had positive predictive value of 0.83 and F1-score of 0.88.

Temporal validation of the algorithm developed in this study demonstrates a proof-of-concept application of NLP for automated reporting of adverse events after spine surgery. Adapting this methodology for other procedures and outcomes in spine and orthopaedics has the potential to dramatically improve and automatize quality and safety reporting [4].

The leading causal agent of SSI after spine operations is Staphylococcus aureus [5].

1)
O'Toole J E, Eichholz K M, Fessler R G. Surgical site infection rates after minimally invasive spinal surgery. J Neurosurg Spine. 2009;11(4):471–476.
2)
Schimmel J J, Horsting P P, de Kleuver M, Wonders G, van Limbeek J. Risk factors for deep surgical site infections after spinal fusion. Eur Spine J. 2010;19(10):1711–1719
3)
Daniels AH, Kawaguchi S, Contag AG, Rastegar F, Waagmeester G, Anderson PA, Arthur M, Hart RA. Hospital charges associated with “never events”: comparison of anterior cervical discectomy and fusion, posterior lumbar interbody fusion, and lumbar laminectomy to total joint arthroplasty. J Neurosurg Spine. 2016 Aug;25(2):165-9. doi: 10.3171/2015.11.SPINE15776. Epub 2016 Mar 18. PubMed PMID: 26989978.
4)
Karhade AV, Bongers MER, Groot OQ, Cha TD, Doorly TP, Fogel HA, Hershman SH, Tobert DG, Schoenfeld AJ, Kang JD, Harris MB, Bono CM, Schwab JH. Can natural language processing provide accurate, automated reporting of wound infection requiring reoperation after lumbar discectomy? Spine J. 2020 Mar 4. pii: S1529-9430(20)30088-7. doi: 10.1016/j.spinee.2020.02.021. [Epub ahead of print] PubMed PMID: 32145358.
5)
Chahoud J, Kanafani Z, Kanj SS. Surgical site infections following spine surgery: Eliminating the

controversies in the diagnosis. Front Med (Lausanne) 2014;1:7.