

Santosh Patel:

PUBLICATIONS: NEURAXIAL DRUG ADMINISTRATION ERRORS:

All review articles, research letters, and abstracts are the first publications in the history of the anaesthesia literature.

■ PUBLISHED: Peer review publications.

Medical Intelligence Article:

Patel S, Loveridge R: Obstetric neuraxial wrong drug administration errors: A quantitative and qualitative analytical review. *Anesth Analg* 2015; 121:1570-1577
DOI: <https://doi.org/10.1213/ANE.0000000000000938>

Cited by 64 as per Google Scholar

(Our research in the article was included in 'What is new in Obstetric Anesthesia : The 2016 Gerard W Ostheimer Lecture' by Philip E Hess published in *Anesth Analg* 2017; 124:863-871)

(Our work was included in "Survey of Anesthesiology". Patel, Santosh; Loveridge, Robert Obstetric Neuraxial Drug Administration Errors, *Survey of Anesthesiology*: December 2016 - Volume 60 - Issue 6 - p 250
doi: 10.1097/01.sa.0000504624.15149.36)

Review Articles:

Patel S. A Systematic review of antibiotic administration incidents involving neuraxial routes: Clinical analysis, contributing factors and prevention approaches. *Pain Ther.* 2025; 14(2): 445-460 doi: 10.1007/s40122-024-00701-7. PMID: 39792237.

<https://rdcu.be/d5U2P> (link for a pdf copy)

Additional 16 pages supplemental file is also published with the article.

Cited by 1

Patel S: Accidental intrathecal tranexamic acid administrations during spinal anaesthesia and their reporting in India - A Narrative Review'. *Int J Pharm Sci & Res* 2024; 15(10): 2977-82. doi: 10.13040/IJPSR.0975-8232.15(10).2977-82.

In the article, intrathecal tranexamic acid error database is published. Also, figures showing country-wise and year-wise distribution of errors are published.

Patel S. Inadvertent administration of intravenous anesthesia induction agents via the epidural, intrathecal, intracerebroventricular or brachial plexus route – A Narrative Review. *Ind J Anaesth* 2024; 68:439-446
https://journals.lww.com/ijaweb/fulltext/2024/68050/inadvertent_administration_of_intravenous.6.aspx

In addition, three supplemental files are also published.

Cited by 1 as per Google Scholar.

Patel S. Tranexamic acid-associated intrathecal toxicity during spinal anaesthesia A narrative review of 22 recent reports. *European J of Anaesthesiology* 2023; 40: 334-342. doi: 10.1097/EJA.0000000000001812

In addition, three supplemental files (13 pages) are also published (literature search strategy – 1 page, Clinical case analysis table -11pages, Human factors 1 page).
https://journals.lww.com/ejanaesthesiology/Abstract/9900/Tranexamic_acid_associated_intrathecal_toxicity.70.aspx

Cited by 24

Patel S. Cardiovascular drug administration errors during neuraxial anesthesia or analgesia—A narrative review. *Journal of Cardiothoracic and Vascular Anesthesia* 2023; 37: 291-298

In addition, three supplemental files (16 pages) are also published (literature search strategy – 3 pages, HFACS categories table 1 page, Clinical case analysis table -12 pages)

<https://www.sciencedirect.com/science/article/abs/pii/S1053077022007686>

[https://www.jcvaonline.com/article/S1053-0770\(22\)00768-6/fulltext](https://www.jcvaonline.com/article/S1053-0770(22)00768-6/fulltext)

<https://doi.org/10.1053/j.jvca.2022.10.016>

Cited by 16

Patel S, Dexter F. Narrative review of neuraxial potassium chloride administration errors: clinical features, human factors, and prevention measures. *Regional Anesthesia & Pain Medicine* 2021; 46: 904-908 doi: 10.1136/rapm-2021-102933

In addition, two supplemental files (19 pages) are also published.

<https://rapm.bmj.com/content/46/10/904.abstract>

Cited by 12 as per Google scholar

Patel, S. Erroneous neuraxial administration of neuromuscular blocking drugs. *European Journal of Anaesthesiology* 2020; 37: 857-863

https://journals.lww.com/ejanaesthesiology/fulltext/2020/10000/erroneous_neuraxial_administration_of.5.aspx

Cited by 8 as per Google scholar.

S Patel, B Robertson, I McConachie. Catastrophic drug errors involving tranexamic acid administered during spinal anaesthesia. *Anaesthesia*. 2019; 74: 904-14

<https://onlinelibrary.wiley.com/doi/abs/10.1111/anae.14662>

- Cited by 97 as per Google scholar

- This article is accompanied by an editorial – A Palanisamy and S M Kinsella: Spinal tranexamic acid – a new killer in town. Anaesthesia 2019; 74: 831-3 <https://onlinelibrary.wiley.com/doi/10.1111/anae.14632>)
- The article was selected as one of the top 10 articles for 2019 for 'Anaesthesia' journal. <https://associationofanaesthetists-publications.onlinelibrary.wiley.com/hub/journal/13652044/homepage/top10-2019>
- The article has a high Altmetric Score.
- The article was a topic for publication in 'Anesthesiology News' June, 2019. <https://www.anesthesiologynews.com/Clinical-Anesthesiology/Article/06-19/Spinal-Administration-of-Tranexamic-Acid-Catastrophic-and-Avoidable/55134>
- The article was used by Institute for Safe Medication Practices, USA to include intrathecal tranexamic acid as one of the top 10 hazards to avoid for 2020. <https://www.ismp.org/resources/start-new-year-right-preventing-these-top-10-medication-errors-and-hazards>
- The article was Editor's pick for June 2020 issue of Obstetric Anesthesia Digest (Patel, S.; Robertson, B.; McConachie, I. Catastrophic Drug Errors Involving Tranexamic Acid Administered During Spinal Anesthesia, Obstetric Anesthesia Digest: June 2020 - Volume 40 - Issue 2 - p 57-58 https://journals.lww.com/obstetricanesthesia/Abstract/2020/06000/Catastrophic_Drug_Errors_Involving_Tranexamic_Acid.5.aspx?context=LatestArticles doi: 10.1097/01.aoa.0000661304.69019.e3)
- It is referenced in an alert by World health organization <https://www.who.int/news/item/16-03-2022-risk-of-medication-errors-with-tranexamic-acid-injection-resulting-in-inadvertent-intrathecal-injection>
- Institute for Safe Medication Practices, Canada used the article and referenced in newsletter alert published in May 2022. <https://ismpcanada.ca/bulletin/alert-substitution-error-with-tranexamic-acid-during-spinal...>
- The article is cited in national safety alerts issued by several countries

Editorial

Patel S. Safe spinal anesthesia practices to prevent intrathecal tranexamic acid incidents. Journal of clinical anesthesia 2022;;82:110889.

Cited by 3 as per Google scholar

<https://www.sciencedirect.com/science/article/abs/pii/S0952818022002471?via%3Di>
hub

Research Letter:

Patel S. Accidental epidural infusion of acetaminophen (Paracetamol) during acute postoperative and labor pain management. *Anesth Analg.* 2025 ;140(5):1230-1232. doi: 10.1213/ANE.00000000000007287. PMID: 39774477.

Link - [Anesthesia & Analgesia](#)

<https://pubmed.ncbi.nlm.nih.gov/39774477/>

In addition, one supplemental file is also published.

Cited by 1 as per Google Scholar.

Correspondence/ Letter to editor:

Patel S. Accidental infusion of tranexamic acid via a thoracic epidural catheter. *Canadian Journal of anesthesia* 2023;70: 915-916 doi:10.1007/s12630-023-02435-0. <https://link.springer.com/article/10.1007/s12630-023-02435-0>

Cited by 4

The above letter is accompanied with-

1. An Editorial: [Preventing neuraxial administration of tranexamic acid](#)
<https://link.springer.com/article/10.1007/s12630-023-02434-1>
2. Editor in Chief (EIC)'s notes: [One week in the life of my anesthetic cart's medication drawer or: drug errors—what \(else\) will it take to change the system?](#)
<https://link.springer.com/article/10.1007/s12630-023-02437-y>

Patel S. Epidural and intrathecal magnesium sulphate administration errors – clinical features and contributory factors. *British J of Anaesthesia* 2023; 130: E35-40
In addition, one supplemental file is also published (1 page).

I reviewed magnesium sulphate administration errors via neuraxial route.

<https://www.sciencedirect.com/science/article/abs/pii/S0007091222007401>
[https://www.bjanaesthesia.org/article/S0007-0912\(22\)00740-1/fulltext](https://www.bjanaesthesia.org/article/S0007-0912(22)00740-1/fulltext)

Cited by 3 as per Google Scholar

Patel S. Neuraxial and peripheral misconnection events leading to wrong-route medication errors. *Reg Anesth Pain Med.* 2021;48:1116-1117 doi: 10.1136/rapm-2021-102527.

<https://rapm.bmj.com/content/46/12/1116.info>

ISMP Guideline:

Institute for safe medication practices (Canada): Substitution errors with tranexamic acid during spinal anesthesia. *ISMP Canada Safety Bulletin* 2022; Issue 6: 1-5.

<https://ismpcanada.ca/bulletin/alert-substitution-error-with-tranexamic-acid-during-spinal-anesthesia/>

Abstracts in Journals:

Patel S. Inadvertent neuraxial antibiotic administration incidents: a review of the literature. *Anaesthesia* 2023;78 (Suppl 3):21 **[ORAL PRESENTATION]**
<https://doi.org/10.1111/anae.16111>

Patel S. A review of neuraxial paracetamol, non-steroidal anti-inflammatory analgesics and anti-emetics errors. *Anaesthesia* 2023;78 (Suppl 3): 58
<https://doi.org/10.1111/anae.16111>

Patel S. Intrathecal tranexamic acid incidents in India: a problem of lookalike ampoule or a physician's incorrect visual perception? *Anaesthesia* 2023;78 (Suppl 3): 58
<https://doi.org/10.1111/anae.16111>

Patel S: Avoidable intrathecal tranexamic acid tragedies: 2019–2021. *Anaesthesia* 2021;76 (Suppl 6):17 **[ORAL PRESENTATION]**

Cited by 1

<https://associationofanaesthetists-publications.onlinelibrary.wiley.com/toc/13652044/2021/76/S6>

Patel S, Paskaleva R, Agrawal D. 185 neuraxial drug administration errors from 40 countries – practical issues and human factors. *Regional Anesthesia & Pain Medicine* 2021;**70**:A21-A23.
https://rapm.bmj.com/content/70/Suppl_1/A21.2

Patel S, Dexter F. Neuraxial cardiovascular accidental drug administration errors review. *Regional Anesthesia & Pain Medicine* 2021;**70**:A24-A25.
https://rapm.bmj.com/content/70/Suppl_1/A24

Cited by 3

Patel S and Daxter F: Case Series Of 28 Neuraxial Kcl Administrations Shows Half The Errors Are Not Preventable By NrFit. www.asaabstracts.com A2042, 2020 **[ORAL PRESENTATION]**

<http://www.asaabstracts.com/strands/asaabstracts/abstract.htm?year=2020&index=18&absnum=4742>

Cited by 1 as per Google Scholar.

Patel S: Morbidity And Mortality Associated With Drug Administration Errors During Spinal Or Epidural Anesthesia Or Analgesia. www.asaabstracts.com A2045, 2020 **[ORAL PRESENTATION]**

Cited by 1 as per Google Scholar.

Patel S. Drug administration errors during epidural or spinal anesthesia or analgesia. Anesth Analg 2012; 113:S-197 **[ORAL PRESENTATION]**
<https://journals.lww.com/anesthesia-analgesia/toc/2012/05001#1948442060>

(This abstract was selected as the best abstract in 'patient safety and education' category and was selected for **Kosaka Abstract Award** competition at the 86th International Anesthesia Research Society meeting held in Boston, USA in May, 2012)

Patel S, Patel S. Epidural and spinal drug injection errors during obstetric anesthesia and analgesia (1981-2011). Anesth Analg 2012; 113:S-329
<https://journals.lww.com/anesthesia-analgesia/toc/2012/05001#1948442060>

The above two abstracts presented at International Anaesthesia Research Society (IARS) meeting in Boston, USA in 2012 were featured in 'Anesthesiology News'.
<https://www.anesthesiologynews.com/Clinical-Anesthesiology/Article/09-12/Review-of-Avoidable-Regional-Errors-Exposes-Shocking-Lapses/21543>