

Santosh Patel:

PUBLICATIONS: MEDICATION ADMINISTRATION ERRORS (Neuraxial, Intravenous and Oral routes):

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. Intravenous magnesium administration errors, attributing factors and associated respiratory or cardiopulmonary arrest in obstetric and non-obstetric patients-A systematic review. *Anaesth Crit Care Pain Med.* 2026; 45(1):101621. doi: 10.1016/j.accpm.2025.101621. Epub ahead of print. PMID: 41033447.

In addition, three supplemental files (9 pages) are also published.

[Intravenous magnesium administration errors, attributing factors and associated respiratory or cardiopulmonary arrest in obstetric and non-obstetric patients—A systematic review - ScienceDirect](#)

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_int_ravenous.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 -11 pages, 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/rappm-2021-102933

In addition, two supplemental files (19 pages) are also published (search strategy – 6 pages, clinical case analysis table – 13 pages)

<https://rapm.bmjjournals.org/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/ejanaesthesia/fulltext/2020/10000/erroneous_neuraxial_administration_of.5.aspx

Cited by 9 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. 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.0000000000007287. 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. Bhatia, Ka. Prevalence and prevention of medication errors in obstetric anesthesia practice. Journal of Obstetric Anaesthesia and Critical Care 2025; 15: 85-86 DOI: 10.4103/JOACC.JOACC_60_24

https://journals.lww.com/joac/fulltext/2025/01000/prevalence_and_prevention_of_m edication_errors_in.20.aspx

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)
<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/s12630-023-02435-0)

<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

Markey T, Bhatia K, **Patel S.** Accidental oral administration of Monsel's solution during caesarean delivery. International Journal of Obstetric Anesthesia 2022; 52:103597.

<https://pubmed.ncbi.nlm.nih.gov/36183608/>
A case report of a rare drug error.

Cited by 2 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.bmjjournals.org/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.bmjjournals.org/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.bmjjournals.org/content/70/Suppl_1/A24

Cited by 3

Patel S and Dexter 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. 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>