

**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\\_int\\_ravenous.6.aspx](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 -11pages, Human factors 1 page).  
[https://journals.lww.com/ejanaesthesia/Abstract/9900/Tranexamic\\_acid\\_associated\\_intrathecal\\_toxicity.70.aspx](https://journals.lww.com/ejanaesthesia/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.

<https://rappm.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](https://journals.lww.com/ejanaesthesia/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](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%3Dhub>

### **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.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.** 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/s12630-023-02437-y)  
<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/rappm-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](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](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](http://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](http://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 86<sup>th</sup> 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>