Prescribing Opioids in Dental Settings: A Concise Review

Dr. Priya Ramesh, Dr. Amit Verma, Dr. Sushmita Dey
Department of Mathematics, Anna University, Chennai, Tamil Nadu, India
Department of Mechanical Engineering, IIT Kanpur, Kanpur, Uttar Pradesh, India
Department of Biotechnology, Jadavpur University, Kolkata, West Bengal, India

Keywords:
Opioids, Prescription, Dental, Analgesia.

Abstract

Opioids are strong analgesics available from ancient time. Natural as well as synthetic preparations are available in the market. It is generally prescribed by medical and dental practitioners to manage cancerous and non-cancerous pain. Besides providing pain relief, opioids produce side effects. In addition, chronic use of opioids leads to dependence and addiction. Lack of awareness or fear among dentists and patients may lead to over/under prescription of these medications. A step up approach with supplemented and as required opioid medication may achieve adequate pain control. A screening of potential future abuse and misuse is required prior to the commencement of opioid administration. Education and counseling further mitigates opioid risks and solves problems of excess medication. A brief review of opioid prescription practice in dental practice is presented here.

Introduction

The use of opioids has been known since ancient period, initially as euphoriant and later as pain remedy.[1] Opioids are being used for both cancerous and non-cancerous pain in adults and children.[2,3] World Health Organization has proposed analgesic pain ladder for cancer pain in 1986.[4] While use of opioid in cancer pain is being universallyadopted; its administration for non-cancer pain has been controversial and debatable.[5,6] During the past few years a noticeable rise in prescription of opioid has happened, called as 'Opioid Epidemic'.[7,8,9] Dental practitioners routinely encounter patients for medical and surgical intervention, requiring potent analgesics. Assessment of requirement and prescription of opioids, in these patients is a challenge to a dental practitioner. [10,11] Lack of awareness of comprehensive guidelines and monitoring services may further complicate the situation, leaving the dentist over or under prescribing these medications.

Pharmacology

Opiates are naturally occurring alkaloids, derived from opium poppy (Papaver somniferum), which is cultivated as agricultural crop. Morphine is a potent analgesic, and predominant natural alkaloid, extracted from poppy plant. Other products derived are thebaine, codeine, papaverine and noscapine. While semi-synthetic opioids are manufactured mainly from natural substance like morphine and codeine, synthetic opioids are also available in market.[1]

There are several types of receptors: MOP, KOP, DOP and NOP, located in various sites of the body, on which opioids acts.[12] Opioids may interact with these receptors selectively or non-selectively, producing different effects including analgesia.[1] MOP is mostly involved with analgesia, respiratory depression, constipation, tolerance and dependence, and endocrine and immunological effects. With some opioids KOP mediate analgesic effects.[13]
Tolerance and dependence with opioid develop after prolonged period of use. While the reason for physical dependence is altered physiological state, tolerance may be genetic, pharmacokinetic or pharmacodynamic.[14] Even after use of receptor selective opioids, undesirable side effects (nausea, vomiting, constipation, sedation, cognitive impairment, myoclonus, pruritus and hypogonadism) present, requiring pharmacological and non-pharmacological treatments.[15] Incomplete cross tolerance between opioids require careful dose conversion while switching from one to another.[13]
Opioid antagonists are competitive in nature, producing inverse effects of opioids. Opioid agonist antagonists have agonist effect on a receptor along with antagonist effect on another receptor.[16]

Opioids in dental practice

Analgesics are used in dental practices for acute or chronic pain of malignant or non malignant origin. Pulpal and periapical diseases are common in dental practices. Although the absolute treatment of acute dental pain lies with eradication of underlying disease process, perioperative period requires analgesic use. Dental extraction, endodontic therapy and scaling are common procedures requiring analgesic use.[17] Chronic orofacial pain having undefined origin, may require longer, complex and multidisciplinary treatment approach.[18,19]

The assessment of intensity of pain is performed differently for acute and chronic pain.[20] Visual analogue scale (VAS) and numeric rating scale (NRS) is used for acute pain after dental surgeries.[21] Measurement of pain intensity may be difficult in children, for this face pain scale is utilized.[22] Chronic pain measurement tools consists of Brief Pain Inventory, McGill Pain Questionnaire and the short-form McGill Pain Questionnaire, and Massachusetts General Hospital Pain Center's Pain Assessment Form. [20]

The first line of management for dental pain of mild to moderate nature, is acetaminophen, due to its high benefit risk ratio.[23] Non-steroidal anti-inflammatory drugs (NSAIDs) are prescribed alone or combined with acetaminophen in patients, who do not get adequate relief after acetaminophen therapy.[24] Opioids may be indicated in patients if acetaminophen and NSAIDs may not alone be sufficient. Pain of severe nature, maxillofacial surgery, third molar extraction, NSAIDs allergy or side effects may require opioid prescription.[17,23-25] Breakthrough pain, non-responsive to acetaminophen and NSAIDs, require short duration of opioid medication.[25]

A step up rather than step down approach in prescription would avoid unnecessary use of opioids and its side effects. [25,26] Non-opioids (acetaminophen or NSAIDs) are prescribed at first step for mild to moderate pain, and depending up on adequacy of pain relief an opioid is added at second step.[25] This multimodal approach helps in reducing number of opioid prescription. Multiple combination analgesics are available in market and have advantage of additive action and satisfactory pain control.[27] Drug overdose with acetaminophen and side effects with NSAIDs may limit its use as fixed dose combination.[28] Prescribing combination medication only for acute pain and separating the prescription of opioids and non-opioids for chronic cases may avoid this problem.[27]

Congenital birth defect, respiratory depression and opioid withdrawal have been reported, when these drugs are administered during pregnancy.[29] A cautious approach should be maintained with prescription of opioids to women of child bearing age. Pediatric patients may receive opioids apart from non-opioid, as and when required, and for breakthrough pain.[30] Dose calculation should be careful to prevent respiratory depression.

Abuse and misuse

The use of opioids for pain management for non-cancer pain can result in dependence and misuse.[31] Prediction of future abuse of prescription opioid may bedifficult; some patients are possibly more at risk as compared to others.[32] Multiple questionnaires have been developed as screening instruments.[32-34] History of drug abuse, young age, thrill seeking behavior, coexisting psychiatric illness, legal problems, criminal activity, smoking and alcohol intake are risk factors for opioid abuse.[35] Physical examination, toxicology and psychiatric assessment are required prior to commencement of opioid therapy. Legal status of opioid medication varies from place to place. Dentist should adhere to local laws related to opioid prescription.[36] The prescribed medicine may be diverted for non-medical use.[36,37] Opioid abuse and addiction in dental practice may be limited for the reason that the drug is prescribed for short period of time, and generally mild opioids are prescribed in these cases. Further, prescription drug monitoring programs should be embedded in dental practice to improve the quality of drug prescription.[38,39,40]

Education and counseling

Education and knowledge is an important part of opioid prescription and helps in risk mitigation. Dentists, paramedical staffs and patients should be well informed about indications, side effects and abuse potentials of opioids.[36,41] Patient communication about alternatives to opioids is equally significant. Opioid overdose is one of the complications, which leads to fatality. Recognizing sign and symptoms of overdose is of great importance to patients and dentists.[42]

Dental problems are generally of short period resulting in problem of leftover opioid medications. The patients should be instructed about safe storage of opioids, and safe disposal practice of excessive medicine should be implemented whenever it is no longer required.[36,43,44] Prescription of excessive analgesics for minor procedures should be discouraged.[44]

Discontinuation of opioid therapy

Patients taking opioid medication for short duration (< 1 week) can stop taking drugs abruptly. While patients with longer duration of opioid consumption may develop dependence and require tapering of medication gradually.[36] Opioid should also be discontinued if treatment goal is not achieved, severe adverse effects are present, or if there are signs of drugs abuse and diversion.[45] If signs of addiction or tolerance are present, a substance abuse or addiction specialist should be consulted.[46]

Conclusion

Opioid, being strong analgesic, is required by some of the patients presenting for dental procedures and surgeries. Opioid pharmacology is complex; it involves multiples drugs acting on different receptors, and produces effects depending upon agonistic and agonistic properties. A structured approach in prescription reduces opioid side effects, and leads to less dependence and addiction. Further, by preventing over/under prescription, it provides better pain management experience to patients. Non-opioid prescription first then addition of opioid is generally followed for severe and breakthrough pain. Mild opioid use for short period of time limits abuse and misuse of opioids. Education and counseling focuses on side effects and abuse potential, and is an important component of opioid prescription.

References

1. Brownstein MJ. A brief history of opiates, opioid peptides, and opioid receptors. Proc Natl AcadSci U S A. 1993 Jun 15; 90(12): 5391–5393.
2. Quigley C. The role of opioids in cancer pain. BMJ. 2005 Oct 8; 331(7520): 825–829.
3. Häuser W, BockF,Engeser P, TölleT, Willweber-StrumpfA, PetzkeF.Long-Term Opioid Use in Non-Cancer Pain. DtschArztebl Int. 2014 Oct; 111(43): 732–740.
4. World Health Organization. Cancer Pain relief. 1986. 16-21
5. Bruehl S, Apkarian AV, Ballantyne JC, Berger A, Borsook D, Chen WG, Farrar JT, Haythornthwaite JA, Horn SD, Iadarola MJ, Inturrisi CE, Lao L, Mackey S, Mao J, Sawczuk A, Uhl GR, Witter J, Woolf CJ, Zubieta JK, Lin Y. Personalized medicine and opioid analgesic prescribing for chronic pain: opportunities and challenges. J Pain 2013;14:103–13.
6. Dowell D, Haegerich TM, Chou R. CDC Guideline for Prescribing Opioids for Chronic Pain--United States, 2016. JAMA. 2016 Apr 19;315(15):1624-45.
7. Murthy VH. Ending the Opioid Epidemic - A Call to Action. N Engl J Med. 2016 Dec 22;375(25):2413-2415.
8. Manchikanti L, Helm S 2nd, Fellows B, Janata JW, Pampati V, Grider JS, Boswell MV. Opioid epidemic in the United States. Pain Physician. 2012 Jul;15(3 Suppl):ES9-38.
9. Nelson LS, Juurlink DN, Perrone J. Addressing the Opioid Epidemic. JAMA. 2015 Oct 13;314(14):1453-4
10. Chakote K, Guggenheimer J. Implications of use of opioid-containing analgesics for palliation of acute dental pain. J Opioid Manag. 2019 Jan/Feb;15(1):35-41.
11. McCauley JL, Gilbert GH, Cochran DL, Gordan VV, Leite RS, Fillingim RB, Brady KT. National Dental PBRN Collaborative Group. Prescription Drug Monitoring Program Use: National Dental PBRN Results. JDR Clin Trans Res. 2019 Apr;4(2):178-186.
12. Waldhoer M, Bartlett SE, Whistler JL. Opioid Receptors. Annu. Rev. Biochem. 2004. 73:953–90.
13. Pasternak GW. Preclinical Pharmacology and Opioid Combinations. Pain Med. 2012 Mar 1; 13(s1): S4–S11.
14. Benyamin R, Trescot AM, Datta S, Buenaventura R, Adlaka R, Sehgal N, Glaser SE, Vallejo R. Opioid complications and side effects. Pain Physician. 2008 Mar;11(2 Suppl):S105-20.
15. Christo PJ. Opioid effectiveness and side effects in chronic pain. AnesthesiolClin North Am. 2003 Dec;21(4):699-713.
16. Martin WR. Opioid Antagonists. Pharm. Rev. December 1967, 19 (4) 463-521.
17. Mehlisch DR. The efficacy of combination analgesic therapy in relieving dental pain. J Am Dent Assoc. 2002 Jul;133(7):861-71.
18. Aggarwal VR, Macfarlane GJ, FarragherTM, and McBethJ. Risk factors for onset of chronic oro-facial pain – Results of the North Cheshire oro-facial pain prospective population study. Pain. 2010 May; 149(2): 354–359.

19. Madland G and Feinmann C. Chronic facial pain: a multidisciplinary problem. J NeurolNeurosurg Psychiatry. 2001 Dec; 71(6): 716–719.
20. Breivik H , Borchgrevink PC, Allen SM, Rosseland LA, Romundstad L, Hals EK, Kvarstein G, Stubhaug A. Assessment of pain. Br J Anaesth. 2008 Jul;101(1):17-24.
21. Seymour RA. The use of pain scales in assessing the efficacy of analgesics in post-operative dental pain. Eur J ClinPharmacol. 1982;23(5):441-4.
22. Hicks CL, von Baeyer CL, Spafford PA, van Korlaar I, Goodenough B. The Faces Pain Scale-Revised: toward a common metric in pediatric pain measurement. Pain. 2001 Aug;93(2):173-83.
23. Haas DA. An Update on Analgesics for the Managementof Acute Postoperative Dental Pain. Can Dent Assoc 2002; 68(8):476-82.
24. Hargreaves K, Abbott PV. Drugs for pain management in dentistry. Aust Dent J. 2005 Dec;50(4 Suppl 2):S14-22.
25. Becker DE, and Phero JC. Drug Therapy in Dental Practice: Nonopioid and Opioid Analgesics. AnesthProg. 2005 Winter; 52(4): 140–149.
26. Mehlisch DR. The efficacy of combination analgesic therapy in relieving dental pain. J Am Dent Assoc. 2002 Jul;133(7):861-71.
27. Raffa RB. Pharmacology of oral combination analgesics: rational therapy for pain. J Clin Pharm Ther. 2001 Aug;26(4):257-64.
28. Clark R, Fisher JE, Sketris IS, Johnston GM. Population prevalence of high dose paracetamol in dispensed paracetamol/opioid prescription combinations: an observational study. BMC ClinPharmacol. 2012 Jun 18;12:11.
29. Moore PA. Selecting drugs for the pregnant dental patient. J Am Dent Assoc. 1998 Sep;129(9):1281-6.
30. Verghese ST, Hannallah RS. Acute pain management in children. J Pain Res. 2010; 3: 105–123.
31. Compton WM, Volkow ND. Abuse of prescription drugs and the risk of addiction. Drug Alcohol Depend. 83S (2006): S4–S7.
32. Sehgal N, Manchikanti L, Smith HS. Prescription opioid abuse in chronic pain: a review of opioid abuse predictors and strategies to curb opioid abuse. Pain Physician. 2012 Jul;15(3 Suppl):ES67-92.
33. Holmes CP, Gatchel RJ, Adams LL, Stowell AW, Hatten A, Noe C,Lou L. An opioid screening instrument: long-term evaluation of the utility of the pain medication questionnaire. Pain Pract. 2006 Jun;6(2):69-71.
34. Knisely JS, Wunsch MJ, Cropsey KL, Campbell ED. Prescription Opioid Misuse Index: a brief questionnaire to assess misuse. JSubst Abuse Treat. 2008 Dec;35(4):380-6.
35. Jamison RN, Serraillier J, and Michna E. Assessment and Treatment of Abuse Risk in Opioid Prescribing for Chronic Pain. Pain Res Treat. 2011; 2011: 941808.
36. Denisco RC, Kenna GA, O'Neil MG, Kulich RJ, Moore PA, Kane WT, Mehta NR, Hersh EV, Katz NP. Prevention of prescription opioid abuse: the role of the dentist.J Am Dent Assoc. 2011 Jul;142(7):800-10.
37. Cicero TJ, Kurtz SP, Surratt HL, Ibanez GE, Ellis MS, Levi-Minzi MA, Inciardi JA. Multiple Determinants of Specific Modes of Prescription Opioid Diversion.J Drug Issues. 2011 Spring;41(2):283-304.
38. McCauley JL, Leite RS, Melvin CL, Fillingim RB, and Brady KT. Dental opioid prescribing practices and risk mitigation strategy implementation: Identification of potential targets for provider-level intervention. SubstAbus. 2016 Jan-Mar; 37(1): 9–14.
39. Rasubala L, Pernapati L, Velasquez X, Burk J, Ren YF. Impact of a Mandatory Prescription Drug Monitoring Program on Prescription of Opioid Analgesics by Dentists. PLoS One. 2015 Aug 14;10(8).
40. Dana R, Azarpazhooh A, Laghapour N, Suda KJ, Okunseri C. Role of Dentists in Prescribing Opioid Analgesics and Antibiotics: An Overview. Dent Clin North Am. 2018 Apr;62(2):279-294.
41. Alford DP. Opioid Prescribing for Chronic Pain--Achieving the Right Balance through Education. NEngl J Med. 2016 Jan 28;374(4):301-3.
42. Beletsky L, Rich JD, Walley AY. Prevention of Fatal Opioid Overdose. JAMA. 2012 Nov 14; 308(18): 1863–1864.
43. de la Cruz M, Reddy A, Balankari V, Epner M, Frisbee-Hume S, Wu J, Liu D, Yennuraialingam S, Cantu H, Williams J, Bruera E. The Impact of an Educational Program on Patient Practices for Safe Use, Storage, and Disposal of Opioids at a Comprehensive Cancer Center. Oncologist. 2017 Jan;22(1):115-121.
44. Maughan BC, Hersh EV, Shofer FS, Wanner KJ, Archer E, Carrasco LR, Rhodes KV. Unused opioid analgesics and drug disposal following outpatient dental surgery: A randomized controlled trial.Drug Alcohol Depend. 2016 Nov 1;168:328-334.
45. Chou R, Fanciullo GJ, Fine PG et al. Clinical Guidelines for the Use of Chronic Opioid Therapy in Chronic Noncancer Pain**.** J Pain. 2009 Feb; 10(2): 113–130.

46. Aronoff GM.Opioids in chronic pain management: is there a significant risk of addiction? Curr Rev Pain. 2000;4(2):112-21.