

# Topical nonsteroidal anti-inflammatory drugs for corneal abrasions in children

Christine H. Smith MBBS   Ran D. Goldman MD FRCPC

## Abstract

**Question** Corneal abrasion from minor injury to the eye is common in both adults and children. Some of my colleagues prescribe topical nonsteroidal anti-inflammatory drugs (NSAIDs) for analgesia. How safe is this practice?

**Answer** Topical ophthalmic NSAIDs are a short-term effective treatment of the pain associated with corneal abrasions in children. Rare but serious complications have been reported in adult case-study series. Children with corneal abrasions should have follow-up appointments within 24 to 48 hours to assess healing, complications, and side effects of treatment, particularly if they are using topical NSAIDs.

## Anti-inflammatoires non stéroïdiens topiques pour l'abrasion cornéenne chez l'enfant

### Résumé

**Question** L'abrasion cornéenne résultant d'une blessure mineure à l'œil est fréquente autant chez les adultes que chez les enfants. Certains de mes collègues prescrivent des anti-inflammatoires non stéroïdiens (AINS) sous forme topique comme analgésiques. Dans quelle mesure est-ce sécuritaire?

**Réponse** Les AINS ophtalmologiques topiques sont un traitement à court terme efficace pour soulager la douleur associée aux abrasions cornéennes chez les enfants. On a rapporté des complications rares mais graves dans des séries d'études de cas chez l'adulte. Il faut effectuer un suivi chez les enfants qui ont une abrasion cornéenne, dans les 24 à 48 heures, pour évaluer la guérison, les complications et les effets secondaires du traitement, surtout si on utilise des AINS topiques.

Corneal abrasions are disruptions of the integrity of the corneal epithelium that generally heal rapidly, usually within 24 to 72 hours.<sup>1</sup> However, potential complications include scarring, corneal perforation, superinfection, or infectious keratitis. While the most common cause of a corneal abrasion is trauma, it might also occur as a spontaneous defect, or be caused by abrasions from a contact lens or as a result of a foreign body and its removal.

Innervation of the cornea is primarily by the ophthalmic division of the trigeminal nerve and the oculomotor nerve. Symptoms and signs of a potential corneal abrasion include tearing, reluctance of the child to open his or her eyes, the sensation of a foreign body in the eye, photophobia, and redness or injection of the conjunctiva. Visual acuity might or might not be affected by a corneal abrasion. In some younger children corneal abrasions might be manifested as irritability and crying. In one study,<sup>2</sup> nearly 50% of neonates (N=96, aged 1 to 12 weeks) presenting for well-child appointments had corneal abrasions and neither irritability nor sleep disruption were predictors of the presence of corneal abrasions in this population. Thus, one should not

attribute irritability in a neonate to a corneal abrasion without a multisystem review to exclude more serious conditions.<sup>2</sup> Pain, however, can be associated with corneal abrasions and might interfere substantially with children's daily functions, including their sleep, school attendance, and other activities. Pain relief is often imperative for the comfort of children.

### Treating pain

A survey of Canadian emergency physicians revealed a range of practices in managing pain for traumatic corneal abrasions.<sup>3</sup> While there is no evidence-based consensus or guidelines on management of pain associated with corneal abrasions, general recommendations suggest either systemic (oral) or topical ophthalmic analgesics.<sup>1</sup> Topical ophthalmic nonsteroidal anti-inflammatory drug (NSAID) preparations have been used for a range of painful eye conditions, including eye surgery and corneal abrasions.

### Local NSAIDs

The role of topical ophthalmic NSAIDs in traumatic corneal abrasions has been assessed in a single systematic

review and meta-analysis.<sup>4</sup> The use of topical ophthalmic NSAIDs, when compared with placebo drops or polyvinyl alcohol, demonstrated a statistically significant reduction in verbal pain score of 1.3 (95% CI, -1.3 to -1.56) at 24 hours. When including data of studies that used visual analogue scales (0 to 10) for pain, the reduction in pain score was 0.52 (95% CI, -0.91 to -0.13), demonstrating a minor benefit of topical NSAIDs at 24 hours.<sup>4</sup> Many studies were excluded from this meta-analysis owing to inadequate reporting of results.

The current research has several limitations. Notably, pain is often measured at 24 hours, a time when many corneal abrasions have healed. Additionally, most studies assessing topical treatment do not account for co-interventions such as oral analgesics (eg, opioids) that might be taken concomitantly and affect overall pain scores.

Two small studies (N = 88, N = 49) demonstrate substantial reduction in use of supplementary oral analgesics when using topical NSAIDs.<sup>5,6</sup> Evidence is still lacking comparing oral to topical NSAIDs for traumatic corneal abrasions.

In 2012, the Cochrane Collaboration released a protocol indicating its intention to undertake a systematic review of the role of topical NSAIDs in traumatic corneal abrasions.<sup>7</sup>

## Adverse events

The most common reported adverse events associated with ophthalmic NSAIDs include brief burning and stinging, hyperemia of the conjunctiva, and contact dermatitis.<sup>4,8</sup> More concerning are the potential complications of corneal melting and corneal ulceration. Corneal melting is progressive corneal ulceration and destruction of corneal stroma, which can lead to corneal perforation and even visual loss. Owing to the deeper corneal structures being involved, this process might be painless. These effects have been reported in case series when topical NSAIDs have been applied for a protracted period of time (after cataract surgery) or concurrently with topical steroids in adults.<sup>7</sup> Previous reported cases of corneal melts related to use of the generic formulation of diclofenac sodium ophthalmic solution resulted in its removal from the market in 1999. Corneal melts and keratitis with other ophthalmic NSAID preparations have been infrequently reported.<sup>8</sup> General recommendations, while not being

evidence-based, suggest reevaluation of corneal abrasions within 24 to 48 hours.<sup>1</sup> Careful follow-up when using topical NSAIDs is important to ensure evaluation for side effects and complications.

## Conclusion

Topical ophthalmic NSAIDs provide short-term therapy for painful corneal abrasions in children. Evidence that supports safety in long-term use is lacking. Children with corneal abrasions, particularly if they are using ophthalmic NSAIDs, should be reevaluated within 48 hours. ✱

## Competing interests

None declared

## Correspondence

Dr Ran D. Goldman, BC Children's Hospital, Department of Pediatrics, Room K4-226, Ambulatory Care Bldg, 4480 Oak St, Vancouver, BC V6H 3V4; telephone 604 875-2345, extension 7333; fax 604 875-2414; e-mail rgoldman@cw.bc.ca

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