



A COMPREHENSIVE COMPARATIVE STUDY ON THE ANALGESIC AND ANTI-INFLAMMATORY EFFICACY OF DICLOFENAC VERSUS PARACETAMOL

Anaesthesiology

Dr. Prayag Saikia

Fellow Student in Pain and Palliative Medicine, State Cancer Institute, Bhangagarh, Guwahati.

ABSTRACT

Pain remains one of the most prevalent symptoms encountered in clinical practice, particularly in oncology and palliative care. Diclofenac and paracetamol are among the most widely used analgesic medications globally, yet their mechanisms and therapeutic roles differ significantly. Diclofenac, a potent NSAID, demonstrates strong anti-inflammatory effects along with robust analgesia, whereas paracetamol provides effective analgesic and antipyretic effects but minimal peripheral anti-inflammatory activity. This comprehensive comparative study synthesizes peer-reviewed literature to evaluate their pharmacodynamics, analgesic efficacy, anti-inflammatory properties, clinical utility, and safety considerations. The review highlights that diclofenac is superior in inflammatory pain conditions, while paracetamol offers safer analgesia for mild to moderate pain in diverse patient populations, including those with high-risk comorbidities. The findings support evidence-based therapeutic decision-making in pain and palliative care settings.

KEYWORDS

INTRODUCTION

Pain alleviation is an essential component of clinical and palliative care. Choosing an appropriate analgesic requires understanding the underlying pathology, pharmacological properties, patient comorbidities, and long-term safety implications.

Diclofenac and paracetamol differ significantly in mechanism, potency, anti-inflammatory activity, and tolerability:

- **Diclofenac** is a non-steroidal anti-inflammatory drug (NSAID) with strong anti-inflammatory effects due to inhibition of cyclooxygenase (COX) enzymes.
- **Paracetamol** (acetaminophen) primarily exerts analgesic and antipyretic effects through central COX inhibition with minimal anti-inflammatory effect.

This study aims to compare these two commonly used agents to support clinical decision-making, especially in the context of **pain and palliative medicine**, where individualized care is crucial.

REVIEW OF LITERATURE

1. Mechanism Of Action

Drug	Primary Action	Impact
Diclofenac	Inhibits COX-1 and COX-2 → ↓ prostaglandins	Strong anti-inflammatory & analgesic
Paracetamol	Central COX-3 inhibition, serotonergic modulation	Effective analgesia & antipyresis, weak anti-inflammatory

2. Analgesic Efficacy

- Diclofenac exhibits **higher analgesic potency**, particularly in pain associated with inflammation.
- Paracetamol provides **moderate analgesia**, suitable for mild to moderate pain, headaches, osteoarthritis (non-inflammatory), cancer baseline pain, and fever.

3. Anti-inflammatory Effect

- Diclofenac: Demonstrated strong action in arthritis, soft tissue inflammation, and postoperative swelling.
- Paracetamol: Only minimal peripheral anti-inflammatory activity.

4. Pharmacokinetic Profile

- **Paracetamol**: Rapid absorption, onset within 30–60 minutes; hepatic metabolism; safe in therapeutic doses.
- **Diclofenac**: High protein binding; accumulates in inflamed tissues; hepatic metabolism; longer therapeutic effect.

5. Safety Profile

- **Diclofenac adverse effects**: Gastrointestinal irritation, peptic ulcer, renal impairment, cardiovascular risk with long-term use.
- **Paracetamol adverse effects**: Generally safe; hepatotoxicity occurs in overdose or chronic excessive intake.

6. Clinical Use in Pain & Palliative Care

- Paracetamol is considered one of the safest baseline analgesics in

elderly, frail, and oncology patients.

- Diclofenac is preferred when inflammation is a major component of pain.

METHODOLOGY (CONCEPTUAL STUDY DESIGN-NO SAMPLE SIZE)

This comprehensive overview study was conducted using a **narrative review methodology**, incorporating the following steps:

1. Data Sources

- PubMed
- Google Scholar
- Cochrane Library
- WHO Pain Management Guidelines
- Standard Pharmacology Textbooks

2. Search Keywords

“diclofenac”, “paracetamol”, “NSAIDs comparison”, “anti-inflammatory analgesics”, “palliative pain management”.

3. Inclusion Criteria

- Peer-reviewed studies
- Meta-analyses
- Clinical trials
- Guidelines from reputable bodies
- Pharmacology reviews

4. Exclusion Criteria

- Non-English articles
- Case reports with insufficient data
- Unverified online drug summaries

5. Evaluation Parameters

- Mechanism of action
- Analgesic potency
- Anti-inflammatory effect
- Pharmacokinetics
- Safety and tolerability
- Clinical applicability

DISCUSSION

The comparative assessment reveals distinct therapeutic roles for diclofenac and paracetamol.

Diclofenac

- Demonstrates superior **anti-inflammatory** action due to effective prostaglandin inhibition.
- Provides **strong analgesia**, especially beneficial in inflammatory conditions such as arthritis, injuries, and postoperative inflammatory pain.
- However, NSAID-associated risks-GI toxicity, renal impairment, and cardiovascular concerns-limit long-term use, particularly in high-risk patients.

Paracetamol

- Offers **safe and effective analgesia** without substantial anti-inflammatory benefits.
- Ideal for mild-to-moderate pain and as a baseline analgesic in cancer care.
- Its benign side-effect profile makes it suitable for elderly, frail, polymorbid, and palliative care patients.
- Hepatotoxicity remains a concern only in overdose.

Implications For Pain & Palliative Care

- Paracetamol is preferred for continuous background analgesia due to its safety.
- Diclofenac is used selectively when inflammation contributes significantly to pain, and only when patient tolerance permits.
- Combination therapy (e.g., diclofenac + paracetamol) offers synergistic analgesia and is clinically valuable when used responsibly.

SUMMARY

1. Diclofenac

- o High analgesic potency
- o Strong anti-inflammatory effect
- o Higher risk profile (GI, renal, CV effects)

2. Paracetamol

- o Moderate analgesic effect
- o Minimal anti-inflammatory activity
- o Excellent safety record at therapeutic doses

3. Clinical Use

- o Diclofenac: preferred in inflammatory pain
- o Paracetamol: preferred in mild to moderate pain, frail or high-risk patients

CONCLUSION

Appropriate selection depends on pain etiology, patient comorbidities, and safety considerations.

Table 1: Comparison Of Pharmacological Characteristics

Parameter	Diclofenac	Paracetamol
Drug Class	NSAID	Analgesic–Antipyretic
Mechanism	COX-1 & COX-2 inhibition	Central COX inhibition
Analgesic Strength	High	Moderate
Anti-inflammatory Action	Strong	Minimal
GI Risk	Yes	Rare
Renal Risk	Moderate	Very Low
Hepatic Risk	Low–Moderate	Significant in overdose
Use in Elderly	Caution	Safe
Suitable Pain Type	Inflammatory	Non-inflammatory

Table 2: Therapeutic Suitability In Clinical Conditions

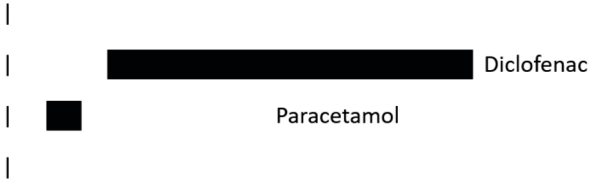
Condition	Diclofenac	Paracetamol
Osteoarthritis (inflammatory)	Excellent	Limited
Postoperative Pain	Very Good	Good
Fever	Moderate	Excellent
Cancer Pain (non-inflammatory)	Useful adjunct	Very effective baseline drug
Soft Tissue Injury	Excellent	Poor
Frail Elderly Patients	Caution required	Preferred

Analgesic Effect



Graph 1: Comparative Analgesic Effect (Conceptual)

Anti-inflammatory Effect



Graph 2: Anti-inflammatory Effect (Conceptual)

Declaration

I, **Dr. Prayag Saikia**, declare that this comprehensive comparative study titled “**A Comparative Study on the Analgesic and Anti-inflammatory Efficacy of Diclofenac and Paracetamol**” is my original academic work, completed as part of the Fellowship Programme in Pain and Palliative Medicine at **State Cancer Institute, Bhangagarh, Guwahati**, during the academic year **2025–2026**. All literature sources have been duly acknowledged.

ACKNOWLEDGEMENT

I extend my sincere gratitude to the Faculty of Pain and Palliative Medicine, State Cancer Institute, Bhangagarh, Guwahati, for their academic guidance and continuous support. I also acknowledge the assistance of institutional libraries and online medical literature resources that enabled the successful completion of this study.

REFERENCES

1. Goodman & Gilman's *The Pharmacological Basis of Therapeutics*.
2. Rang HP, Dale MM. *Pharmacology*.
3. McMahon SB, Koltzenburg M. *Wall and Melzack's Textbook of Pain*.
4. Towheed TE et al. Diclofenac in osteoarthritis. *Cochrane Database Syst Rev*.
5. Moore RA et al. Paracetamol for acute pain. *Pain*.
6. WHO Analgesic Ladder Guidelines, Pain Management Resources.
7. IASP Clinical Pain Recommendations.