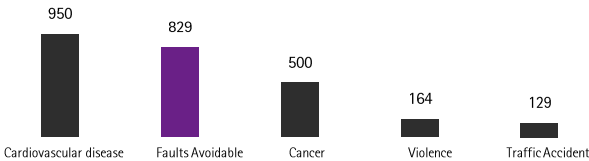


Introduction: Adverse events in hospitals are the second leading cause of death in Brazil. Every 5 minutes, 3 Brazilians die from preventable hospital failures¹, and 42,8% of the events could have been avoidable². A unified drug dose can ensure a lower error probability, in line with International Patient Safety goals. Considering the risk solutions ready to use could be one opportunity to reduce the number of deaths and adverse events³.

1. Figure. Faults avoidable is the second cause of death per day in Brazil



Objective: Evaluate the clinical and economic benefits of ibuprofen IV ready-to-use solutions in treating postoperative pain versus other non-steroidal anti-inflammatory drugs NSAIDs.

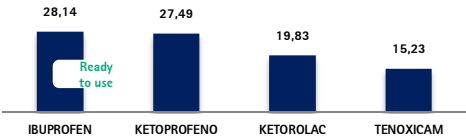
Methods. It were evaluated

- 1. Daily treatment costs of each NSAID, based on CMED list:
 - ketoprofen 300mg/day,
 - tenoxicam 40mg/day,
 - ketorolac 60mg/day
 - ibuprofen IV ready-to-use (RTU) solution 1.200mg/day;
- 2. Multimodal analgesia cost (opioid consumption);
- 3. Adverse effects costs (effects caused by each NSAIDs);
- 4. Cost staffs.

Results

Based on the cost of daily consumption of drugs, ibuprofen IV RTU solution, represent the higher cost. Figure 2. and the consumptions of **supplies and staff labor** the RTU reduce in terms of time the minutes to preparation and the volume of materials (needles, infusion bag and equipment)³.

2. Figure . Cost per dose/day (CMED table)



1. Table – Saving with supplies and staff labor

| Preparation Time and Medication Infusion Time | | | | | Materials |
|---|---------|---------------------------------|---------------|--------------------|------------------------------------|
| Drugs | x / Day | Minutes to prepare and infusion | Total minutes | Cost per labor day | Needles + Infusion bag + Equipment |
| ibuprofen 1200mg | x 3,0 | 3 | 9 | BRL 2,47 | BRL 60,34 |
| Ketorolaco 60mg | x 4,0 | 6 | 24 | BRL 6,60 | BRL 88,68 |
| enoxicam 40mg | x 2,0 | 6 | 12 | BRL 3,30 | BRL 76,58 |
| Ketoprofene 300mg | x 3,0 | 6 | 18 | BRL 4,95 | BRL 82,63 |

* Cost per minutes BRL 0,27 of nurse according to Federal Nursing Council, and material cost Braside table.

The **consumption of opioids** in multimodal therapy with ibuprofen at postoperative procedures is less when comparing with other NSAIDs.

2. Table – Saving of opioids with Ibuprofen

| Procedures | Ibuprofen dose | | Difference of Mg | Saving Cost BRL |
|-------------------------------|---------------------------|-------------|------------------|-----------------|
| | (Opioid mg) | (Opioid mg) | | |
| Bariatric (Gulay, 2018) | 23,94 | 30,23 | -6,29 | 15,21 |
| Cesarean (Lamping,2020) | 105,8 | 143,2 | -37,4 | 90,43 |
| Normal birth (Lamping,2020) | 26,1 | 32,8 | -6,7 | 16,20 |
| Hip Prosthesis (Gürkan, 2019) | 16 | 24 | -8 | 19,34 |
| | 42,96 | 57,56 | -14,60 | 35,30 |
| | Average saving of opioids | | | 35,30 |

Complications associated with the use of opioids with use (antacids, antiemetics, constipation) pre, intra and postoperatively³.

3. Figure. Complications associated to the treatment of adverse events³

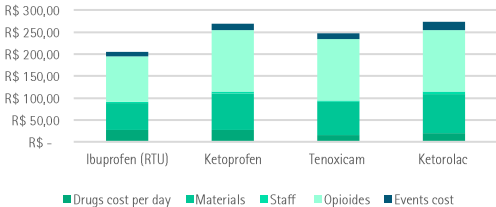


When analyzing the drug's price separately, it appears that the price of ibuprofen IV ready-to-use is higher, but there is a saving when analyzing the entire hospital treatment. The cost of ibuprofen IV ready-to-use versus other NSAIDs, we have a savings of 25% versus ketoprofen, 8% versus tenoxicam, and 21% versus ketorolac.

Conclusions

With more economic savings/cost-benefit, the ready-to-use use of ibuprofen can reach BRL 57,37, or 22% of using other NSAIDs. In addition, it reduces the consumption of inputs, labor, length of stay, opioid reduction, and opioid consumption-related events.

3. Figure . Total Saving with RTU solution



With a savings of BRL 57,37/day compared to other NSAIDs, ready-to-use ibuprofen provided the most cost-effective treatment of post-surgical pain compared to other NSAIDs. Meanwhile, ketoprofen was the most expensive. The most appropriate treatment can reduce the likelihood of complications from adverse effects and the length of hospital stay—consequently, better hospital financial results and better patient quality of life.

References

1. Travençolo, C., et al. A magnitude financeira dos eventos adversos em hospitais no Brasil. Revista Portuguesa de Saúde Pública, Vol. 16, 2002, 107-110.
2. Carakic, C.J., McCormack, P.J., Hyman, B., Beatty, V. Preventable Adverse Events at a Large Tertiary Care Center: A Nine-Year Retrospective Analysis. Joint Commission Journal on Quality and Safety, 44(12): 708-716, 2018, 800.
3. Fujita, R.K. et al. Economic evaluation of post-operative orthopedic surgery of analgesic and antiemetic and analgesic after triphosphate ketorolac, paracetamol and ibuprofen in Brazilian Patients. Fupgk et al. Value in Health, 2011 (adaptation to ibuprofen RTU).
4. Jallat, O.C., Andersen, L., Andersen, M., et al. Guidelines for prevention of nosocomial pneumonia. Infect Control Hosp Epidemiol, 1994;115:687-627.
5. Liu, C., Bayer, A., Congrove, S.E., Damm, R.C., Miller, S.K., Green, R.L., et al. Diretrizes Práticas da Infecção Diversas Sociedades Americanas e Tratamento de Infecções por Sítios e por Correntes Resistentes a Múltiplos Antimicrobianos. Adultos e Crianças. Clin Infect Dis, 2011;52(2):10-e55.
6. Brasil. Ministério da Saúde. Sistema de Gerenciamento da Tabela de Procedimentos, Medicamentos e OPM do SUS (SIGTAP). Competência 08/2021.
7. Brasil. Ministério da Saúde. OMSA 2020. Tablim 2021. Acesso em novembro de 2021.
8. Brasil. Agência Nacional de Vigilância Sanitária. Câmara de Regulação do Mercado de Medicamentos (CRM). Lista de conformidades. Competência 03/2023.
9. Revista Brasileira de Hospitalar. Edição de 2021.
10. Vasconcelos, J.F. et al. Poster presented at the 16th Annual International Congress, New Orleans, USA, May 2013.