

Comparison of Antipyretic and Analgesic Effect of Ibuprofen and Acetaminophen- A Prospective Single Blind Study

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ABSTRACT

Introduction: Acetaminophen and ibuprofen are one of the most frequently used drugs for alleviating pain and fever in children and adults. The pharmacodynamic profile of the two drugs also varies with patient's age. Ibuprofen also is one of Propionic acid derivatives like acetaminophen which inhibits prostaglandin biosynthesis. The aim of the current study was to analyze the effect of both the drugs in alleviating pain and fever associated with sore throat amongst adults

Material and methods: A single blind clinical study was done on adults aged between 32 years-45 years coming to the hospital, institute, state during the period of august 2016- November 2016. All the demographic details including gender and age were obtained for every patient included in the study. Each patient rated his or her preoperative pain on a Heft-Parker visual analogue scale (VAS). Each patient after initial treatment was randomly allocated into one of the two groups- Group I (Ibuprofen) and Group II (acetaminophen). Patients were not allowed to take any other analgesic or antipyretic during the study. Patients also received a VAS to record their pain levels and a tabulated chart to record their temperature regularly for a period of 5 days.

Results: There was statistically no significant difference in the pain and fever score in both the groups. Both the drugs are equally efficacious as an antipyretic and analgesic.

Keywords: Alleviating, analgesic, antipyretic pharmacodynamic.

INTRODUCTION

Acetaminophen and ibuprofen are one of the most frequently used drugs for alleviating pain and fever in children and adults. These are one of the most regularly asked over the counter drugs yet their safety and efficacy margins are uncertain. The pharmacodynamic profile of the two drugs also varies with patient's age. Fever is considered as a physiologic response of body to infection or inflammation but since it is associated with a sense of uneasiness people prefer to take antipyretics to relieve its discomfort. Acetaminophen is an extensively used antipyretic drug because of high efficacy and safety.⁵ It is a derivative of Para amino phenol and inhibits the cyclooxygenase enzyme and prevents release and formation of prostaglandins.⁶ Ibuprofen also is a Propionic acid derivative which inhibits prostaglandin biosynthesis.² Paracetamol and ibuprofen are widely used to treat fever and pain.

Many studies have been done to compare the antipyretic efficacy of both the drugs in children and analgesic efficacy after dental treatment in adults. The aim of the present study is to compare the effect of both the drugs in alleviating pain and fever associated with sore throat amongst adults

MATERIAL AND METHODS

A single blind clinical study was done on adults aged between 32 years-45 years coming to the hospital, institute, state during the

period of august 2016- November 2016. Subjects younger than 18 years, unable to take oral medications, pregnant or nursing women, patients belonging to ASA III or ASA IV category were not included in the study. Only ASA I or ASA II category patients were included in the study. All the demographic details including gender and age were obtained for every patient included in the study. Patients were asked to rate their preoperative pain on a Heft-Parker visual analogue scale (VAS). The VAS was divided into 4 categories - 0 mm was noted as no pain, between 0-54 mm was denoted as mild pain, 54-114mm was denoted as moderate pain and pain greater than or equal to 114 mm was denoted as severe pain. Patients presenting with moderate to severe pain were included in the study. Each patient after initial treatment was randomly allocated into one of the two groups- Group I (Ibuprofen) and Group II (acetaminophen). Group I patients were given 400 mg of brufen and group II patients were given 325 mg of acetaminophen. Patients in both the groups were instructed to take only TDS dose of both the drugs. Additional antibiotics were prescribed in each group. Patients were not allowed to take any other analgesic or antipyretic during the study. Patients also received a VAS to record their pain levels and a tabulated chart to record their temperature regularly for a period of 5 days.

All the patients were informed priory about the study and a written informed consent was obtained from all the patients. ethical committee clearance was also obtained from the concerned authorities. The data obtained from the study was analysed statistically using chi square test. P values of less than 0.05 were considered significant. SPSS software was used for analysis.

RESULT

A total of 91 patients took part in the study. There were approximately 11 drop outs as these subjects fail to give a written evaluation of pain and fever.

Table 1 demonstrates the preoperative data regarding age, gender and initial pain status. There was statistically no significant difference in the preoperative variables in both the groups.

Table 2 describes the pain by day in both group I and Group II. There was statistically no significant difference in pain amongst both the groups and the pain ratings gradually decreased over a

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| | | Ibuprofen group | Acetaminophen group | P value |
|-------------------------------|--------|-----------------|---------------------|---------|
| Subjects analysed | | 46 | 45 | >0.05 |
| Gender | Male | 22 | 25 | >0.05 |
| | Female | 24 | 20 | >0.05 |
| Age(mean +/- S.D.) | | 35.02+/- 11.0 | 38.9+/- 12.5 | >0.05 |
| Initial pain (mean +/- S.D.) | | 135.4+/-27.5 | 124+/- 28.3 | >0.05 |

Table-1: preoperative statistics for ibuprofen and acetaminophen group

| Postoperative day | Ibuprofen group (Mean+/- SD) | Acetaminophen group (Mean+/- SD) | P value |
|-------------------|------------------------------|----------------------------------|---------|
| Day 0 | 82.40 +/- 41.19 | 76.40 +/- 45.66 | >0.05 |
| Day 1 | 67.80 +/-34.67 | 58.60 +/- 32.81 | >0.05 |
| Day 2 | 39.67 +/-25.07 | 37.01+/- 30.78 | >0.05 |
| Day 3 | 17.83 +/-21.61 | 25.21 +/- 22.21 | >0.05 |
| Day 4 | 15.76 +/-16.34 | 15.89 +/- 15.40 | >0.05 |
| Day 5 | 6.04 +/- 12.93 | 7.30 +/- 13.41 | >0.05 |

Table-2: Pain by day

| Postoperative day | Ibuprofen group (Mean+/- SD) | Acetaminophen group (Mean+/- SD) | P value |
|-------------------|------------------------------|----------------------------------|---------|
| Day 0 | 100.32 +/-2.12 | 100.62 +/- 1.98 | >0.05 |
| Day 1 | 99.87 +/- 1.33 | 100.01 +/- 1.21 | >0.05 |
| Day 2 | 99.01 +/- 3.1 | 99.98 +/- 3.34 | >0.05 |
| Day 3 | 98.60 +/- 1.22 | 99.34 +/- 2.10 | >0.05 |
| Day 4 | 98.00 +/- 1.09 | 98.60 +/- 1.76 | >0.05 |
| Day 5 | 98.40 +/- 1.88 | 98.10+/-1.11 | >0.05 |

Table-3 fever by day

period of time.

Table 3 demonstrates the fever as recorded by the subjects. There was statistically no significant difference in the fever scale between both the groups. Fever also decreased with due course of time.

DISCUSSION

Ibuprofen and acetaminophen are generally used over the counter drugs for pain and fever relief. Our present study evaluated their use as antipyretic and analgesic. In our study there was statistically no significant difference in the preoperative data associated with the study. Thus the effect of these variables is minimised in the study.

There was statistically no significant difference in the pain levels reported by the patients in both the groups. The pain gradually decreased over the period of time which was logical and expected. This was in accordance with the natural disease process and body's immune response. According to Simpson et al (24), the mechanism of acetaminophen action is unclear. It is purported to inhibit cyclooxygenase-1 and -2 and modulate the endogenous cannabinoid system by metabolism to AM404. It might also stimulate the descending serotonin pathways. The mechanism of acetaminophen is partially different and might be complementary to ibuprofen hence there is a potential for greater analgesic effects with combination dosing. But because of the complex interaction of peripheral mediators and central ones, it is unpredictable whether their combination would be superior in all treatment models. A study conducted by Menhinick et al comparing the difference in the pain levels

after endodontic treatment using 600 mg of ibuprofen, 600 mg of ibuprofen/1000 mg of acetaminophen combination and a placebo in 57 patients, showed a significant difference in pain levels and concluded that combination of acetaminophen and ibuprofen to be more effective as an analgesic. Merry et al conducted a similar study comparing pain relief after 3rd molar surgery using acetaminophen + ibuprofen, acetaminophen alone and ibuprofen alone. They also concluded that combination of both the drugs was more effective in reducing pain than both of them alone. Both the study differed from our study in pain model (dental origin) and follow up period.

There was no significant difference observed statistically in the fever levels in both the groups. Fever also gradually decreased over time owing to body's immune response and decrease in viral/bacterial load over the period of time. Sullivan and colleagues found that taking acetaminophen or ibuprofen were good and effective antipyretic but the impact of combination treatment was more effective but is likely to be associated with higher complication rate. In a study done by Hollinghailot, acetaminophen plus ibuprofen treatment was more effective in reducing the temperature than both alone.¹¹ In a study by Perrott et al showed single dose of acetaminophen exerted similar effects on pain control when compared to ibuprofen but ibuprofen with dose 5 to 10 mg per kg had more antipyretic effect in comparison to acetaminophen.¹⁶

CONCLUSION

From all the findings this can be easily concluded that acetaminophen and ibuprofen are both equally efficacious as antipyretic and analgesic but according to various studies their combination reveals much more faster results but has its own set of complications.

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