COMPARATIVE EFFECTIVENESS OF PARACETAMOL AND METAMIZOL AS ANTIPYRETICS IN PATIENTS WITH MODERATE AND SEVERE BRAIN INJURY IN DR. SOETOMO HOSPITAL, SURABAYA

Nasruhan A[1], Suharjono[2], Joni Wahyuhadi[2]
[1]Department of Clinical Pharmacy, Faculty of Pharmacy, Universitas Airlangga
[2]Department of Neurosurgery, Dr. Soetomo Hospital, Surabaya

ABSTRAK

Cedera otak berat dan cedera otak sedang merupakan suatu kejadian yang akhir-akhir ini angka kejadiannya terus meningkat. Penderita cedera otak berat maupun sedang mengalami banyak komplikasi yaitu kejang, hipertermia, nyeri dan beberapa komplikasi lainnya. Obat Parasetamol atau Metamizol merupakan obat yang sering digunakan untuk mengangani kasus tersebut. Penelitian ini merupakan penelitian observasi klinis yang bertujuan untuk membandingkan efektifitas Parasetamol dan Metamizol sebagai antipiretik pada pasien dengan cedera otak sedang dan berat di RSUD Dr.Soetomo Surabaya. Populasi target penelitian adalah pasien cedera otak sedang dan cedera otak berat yang mendapat terapi parasetamol dan metamizol dan menjalani rawat inap di semua ruangan SMF Bedah Saraf RSUD Dr. Soetomo Surabaya. Penelitian ini dilakukan dalam jangka waktu 4 bulan yaitu Januari-April 2013. Jumlah pasien dalam penelitian ini masing-masing kelompok adalah 8 yaitu kelompok parasetamol dengan cedera otak sedang, parasetamol dengan cedera otak berat, metamizol dengan cedera otak sedang dan metamizol dengan cedera otak berat dengan jumlah total 32 pasien yang diukur suhunya secara axilla sebelum dan setelah pemberian obat. Suhu pasien diukur pada waktu 15, 30 menit, 1, 2, 3,4 5, 6 jam. Hasil penelitian ini menunjukkan efektifitas parasetamol dan metamizol sebagai antipiretik pada cedera otak sedang tidak memiliki perbedaan yang signifikan (p = 0,583). Efektifitas parasetamol dan metamizol sebagai anitpiretikpada cedera otak berat juga tidak memiliki perbedaan yang signifikan (p = 0,651). Penelitian ini menunjukkan bahwa antipiretik parsetamol dan metamizol memiliki efektifitas sebanding pada pasien cedera otak sedang dan berat di RSUD Dr. Soetomo Surabaya. ***(FMI 2014;50:187-190)***

Kata kunci: *asetaminofen, metamizol, antipiretik, cedera otak, bedah saraf*

ABSTRACT

Patients with moderate and severe brain injury have increased recently. They were having a lot of complications namely seizures, hyperthermia, pain and several other complications. One of the most common complication in patients with moderate and severe brain injury is acute hyperthermia. Acetaminophen or Metamizole is often used for this case. The study of this clinical observation is to compare the effectiveness of Acetaminophen and Metamizole as an antipyretic in patients with moderate and severe brain injuries in Dr. Soetomo hospital. The population of this study was patients with moderate and severe brain injuries in SMF neurosurgery ward in Dr. Soetomo hospital who obtained paracetamol and metamizol as the therapy. The study was taken from January to April 2013. We studied 32 patients who had febrile episode, 8 patients with moderate brain injury and 8 patients with severe brain injury received acetaminophen, 8 patients with moderate brain injury and 8 patients with severe brain injury who received metamizole by axilla examination. Patient's temperature was measured before and 15, 30 minute, 1, 2, 3, 4, 5, 6 hours after drug infusion. This study demonstrates the effectiveness of acetaminophen and metamizole as an antipyretic in moderate brain injury were not significantly different (p = 0.583). The Effectiveness of acetaminophen and metamizole as antipyretic in severe brain injury does not have a significant difference (p = 0.651). Acetaminophen and metamizol have the same antipyretic activity in moderate and severe brain injury in Dr.Soetomo hospital Surabaya. ***(FMI 2014;50:187-190)***

Keywords: *acetaminophen, metamizole, antipyretic, brain injury, neurosurgery*

Correspondence: Nasruhan Arifianto, Department of Clinical Pharmacy, Faculty of Pharmacy, Universitas Airlangga, Jalan Dharmawangsa Dalam, Surabaya 60286, Indonesia. e-mail: nasruhan@gmail.com

INTRODUCTION

A number of brain injuries is larger occurs in developing countries such as Indonesia. Brain injury is one of the main causes of the death among reproductive age caused by the high mobility among the productive age while low maintaining the safety of self-awareness (Soertidewi 2012). Brain injury is the leading cause of death in the age group below 45 years and of the trauma cases that ended in death, brain injury is the leading cause of death of more than 70% of cases. The incidence of brain injury in many countries ranged between 200-300/100.000 population in a year. It was 10% of patients died before arriving at the hospital,

while arriving at the hospital 80% including mild brain injury (Glasgow Coma Scale (GCS) 13-15), 10% moderate brain injury (GCS 9-12) and the rest (10%) severe brain injury (GCS less than or equal to 8) (Muttaqin 1998). This figure is still relatively high for Indonesia as a developing country. Hyperthermia or fever is the most common complication in patients with brain injury (Thompson et al 2003). Hyperthermia is likely to occur due to inflammation of the brain, hipotalamus damage and secondary infections. Hyperthermia itself must be controlled because it can increase the metabolism of glutamate spending and increase neutrophil activity that can harm the brain, increasing the vulnerability to the condition of a secondary pathogen that can cause brain damage (Thompson et al 2003). Paracetamol group chemically lower efficacy than metamizol but do not have chemical groups that can cause side effects either directly (Siswandono 2008). This study will compare the effectiveness of Paracetamol and Metamizol as hyperthermia therapy on the incidence of moderate and severe brain injuries that occur in Dr.Soetomo hospital Surabaya.

MATERIALS AND METHODS

The study was observational clinical study to determine the effects of paracetamol and metamizol antipyretic to patients with moderate brain injury and severe brain injury. The target population is the patients of severe and moderate brain injury who received therapy for paracetamol and metamizol and hospitalized in every room of SMF Neurosurgery Dr.Soetomo Hospital. This research was conducted within a period of 4 months, January to April 2013.

The number of patients in this study each group is 8 which is paracetamol group with moderate brain injury (GCS 9-12), paracetamol with severe brain injury (GCS < 9), metamizol with moderate brain injury (GCS 9-12) and metamizol with severe brain injury (GCS < 9) with a total of 32 patients were measured the temperature on the axilla before and after the drug administration. Temperatures were measured at 15, 30 minutes, 1, 2, 3, 4 5, 6 hours. Drug delivery in the form of paracetamol 1000 mg iv drip and metamizol 1000 mg iv bolus.

Inclusion criteria: Patients experiencing a brain injury of moderate or severe brain injury, hyperthermia complications, receiving paracetamol or metamizol therapy, no contraindications with paracetamol or metamizol. Exclusion criteria: Patients with additional analgesic therapy, patients with additional antipyretic therapy, patients with a history of allergy to paracetamol or metamizol (Anderson et al 2002). Drop out criteria: Patients who experience a hypersensitivity reaction to paracetamol and metamizol, patients who died during the study period.

RESULTS

The temperature results were using as the normality test statistic methods in the Kolmogorov-Smirnov normality test. The results of normality test result that normal data ($p > 0.05$) with the results of eating normal data using statistical parametric statistics are paired t-test.

Table 1. The average data of temperature measurement results

	Metamizol				Parasetamol			
	Severe brain injury: GCS <9 (n = 8)		Moderate brain injury: GCS 9 – 13 (n = 8)		Severe brain injury: GCS <9 (n = 8)		Moderate brain injury: GCS 9 – 13(n = 8)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Temperature before (T_0)	39.1	.68544	38.5	.28158	39.2	.79451	38.3	.21671
Temperature ¼ hours (T_1)	39.0	.65027	38.4	.47434	39.0	.85189	38.2	.16903
Temperature ½ hours (T_2)	38.8	.66319	38.2	.69230	38.8	.87505	38.2	.15059
Temperature 1 hour (T_3)	38.7	.47509	38.1	.69076	38.6	.87168	38.1	.16036
Temperature 2 hours (T_4)	38.4	.55291	37.8	.72198	38.4	.97688	37.9	.25495
Temperature 3 hours (T_5)	38.0	.59281	37.7	.64310	38.3	.76240	37.9	.34408
Temperature 4 hours (T_6)	37.8	.66063	37.6	.76333	38.3	.79631	37.4	.36936
Temperature 5 hours (T_7)	37.7	.37009	37.5	.89443	38.1	.87168	37.3	.44701
Temperature 6 hours (T_8)	37.6	.33568	37.7	.90079	37.9	.87658	37.1	.52763

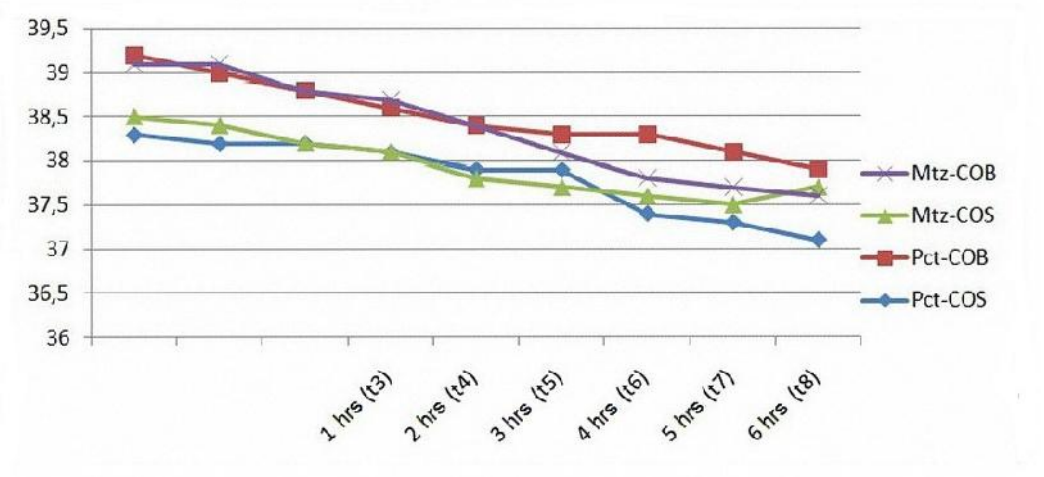

Figure 1. Grafik Temperature Data Average Patient vs. Giving Time at Each Group

The data comparison between metamizol and paracetamol on acquired brain injury is showed that there were no significant differences ($p > 0.05$) between the temperature before giving up at all measurement times after administration (t1-t8) obtained significant data based on statistical tests using a paired t-test.

DISCUSSION

Data comparison between metamizol and paracetamol in severe acquired brain injury is that there is no significant difference ($p > 0.05$) between the temperature before giving up at all measurement times after administration (t1-t8) obtained significant data based on statistical tests using a paired t-test. These results show differences with previous research-research that compares the effectiveness of paracetamol and metamizol. Antipyretic effectiveness of metamizol show better effectiveness in pediatric patients as research done Wong et al (2001) in Europe so is the study done by Vera et al (2012) also in Europe antipyretic effectiveness metamizol was better than paracetamol in critically ill patients with a variety of conditions cause. This difference further clarify the effect of changes in the permeability of the blood brain barrier affect drug transport into it. Because previous research has not experienced the condition of the patient so that the brain cedar permeability of the blood brain barrier is not experiencing changes. To further clarify this theory needs further research between drug levels in the blood brain barrier in patients with normal and drug levels in the blood barrier in patients with brain injury, brain injury both medium and severe brain injury.

The weakness of this study is the number of samples is too small, need for future research using samples with a larger amount. The use of antibiotics in patients studied is different and does not see how the resistance of bacteria to allow for great influence on the improvement of the patient's temperature. For much better in subsequent studies used antibiotic activity and patients alike and resistance to bacterial attack patients also need to know that bacterial factors that cause an increase in temperature can be minimized.

CONCLUSION

This research was conducted in the surgical IRNA Dr.Soetomo hospital using 32 patients with moderate brain injury and severe brain injury within paracetamol or metamizol therapy. It can be concluded from the research that the effectiveness of paracetamol and metamizol as an antipyretic in moderate and severe brain injury does not have a significant difference.

REFERENCES

Anderson PO, Knoben JE, Troutman WG (2002). Handbook of Clinical Drug Data, 10th ed, New York, McGraw-Hill, pp 16-30

Wong A, Sibbald A, Ferrero F, Plager M, Santolaya ME, Escobar AM, Campos S, Barragán S, De León González M, Kesselring GL (2001). Antipyretic effects of dipyrone versus ibuprofen versus acetaminophen in children: results of a multinational, randomized, modified double-blind study. Clin Pediatr (Phila) 40, 313-24

Muttaqin Z (1998). Pengelolaan cedera kepala. Media Medika Indonesia 33, 4-16

Siswandono SB (2008). Kimia Medisinal I, Surabaya, Airlangga University Press, pp 292-308

Soertidewi L (2012). Penatalaksanaan kedaruratan cedera kranioserebral. CDK-193 39, 327-331

Thompson HJ, Tkacs NC, Saatman KE, Raghupathi R, McIntosh TK (2003). Hyperthermia following traumatic brain injury: a critical evaluation. Neurobiol Dis 12, 163-173

Vera P, Zapata L, Gich I, Mancebo J, Betbesé AJ (2012). Hemodynamic and antipyretic effects of paracetamol, metamizol and dexketoprofen in critical patients. Medicina Intensiva 36, 619-625