

HYPERBILIRUBINEMIA TREATMENT OF NEONATUS IN DR. SOETOMO HOSPITAL SURABAYA

Mellisa Kristanti Hosea¹, Risa Etika², Pudji Lestari³

¹Medical Doctor Study Program, ²Department of Pediatrics,

³Department of Public Health, Faculty of Medicine, Airlangga University

ABSTRAK

Hyperbilirubinemia adalah kondisi tingginya kadar bilirubin yang terakumulasi dalam darah dan ditandai dengan ikterus, yaitu timbulnya warna kuning pada kulit, sklera dan kuku. Hyperbilirubinemia adalah masalah yang sering terjadi pada bayi baru lahir. Pasien dengan hiperbilirubinemia neonatal diberi perawatan dengan fototerapi dan transfusi tukar. Tujuan dari penelitian ini adalah untuk mengidentifikasi perawatan hiperbilirubinemia neonatal di RSUD Dr Soetomo Surabaya. Penelitian ini menggunakan rekam medis pasien di bangsal Departemen Anak di RSUD Dr Soetomo Surabaya. Metode pengambilan sampel yang digunakan adalah non probability/consecutive sampling dengan 100 sampel. Semua neonatus dengan hiperbilirubinemia yang dirawat di RSUD Dr Soetomo Surabaya pada tahun 2010 sembuh (100%). Tidak ada pasien yang mengalami komplikasi dan meninggal. Yang paling sering perawatan yang diberikan kepada pasien dengan hiperbilirubinemia neonatal adalah fototerapi lebih dari 24 jam dengan jumlah 68 pasien (68%).(FMI 2015;51:183-186)

Kata kunci: hiperbilirubinemia pada neonatus, perawatan

ABSTRACT

Hyperbilirubinemia is a condition of high levels bilirubin accumulating in blood and known as jaundice, a yellow coloration of the skin, sclera and nails. Hyperbilirubinemia is a problem that often occurs in newborns. Patients with neonatal hyperbilirubinemia are treated with phototherapy and exchange transfusion. The purpose of this study was to identify the hyperbilirubinemia treatments on neonatal in Dr. Soetomo Hospital Surabaya. Medical records were used to collect information on hyperbilirubinemia status and type of treatments in 2010. Inclusion criteria were used to select samples in this study. All hyperbilirubinemia patients (100 neonates) were treated with phototherapy, in which 32% of them got the treatment for less than 24 hours; and 68% got the treatment more than 24 hours. After treatment, 100% patients cured. Hyperbilirubinemia neonates in RSUD Dr Sutomo were treated with phototherapy and the treatment was successful. (FMI 2015;51:183-186)

Keywords: neonatal hyperbilirubinemia, treatments

Correspondence: Mellisa Kristanti Hosea, Medical Doctor Study Program, Faculty of Medicine, Airlangga University, Jl Mayjen Prof dr Moestopo 6-8, Surabaya 60131, Indonesia.

INTRODUCTION

Most (about 98%) of neonatal deaths occur in developing countries. Analysis of 193 countries shows that the number of neonatal deaths ranged from 31% to 98% of infant deaths. While child mortality from common illnesses, such as pneumonia and diarrhea has been reduced, the contribution of neonatal mortality to infant mortality is increasing. Moreover in countries with the highest mortality rate, a significant proportion of deaths occur in the neonatal period. For example, in Ethiopia, neonatal death comprised almost a third of deaths in children (WHO 2005).

Most of the causes of infant and child mortality is a problem that occurs in newborn/neonatal (aged 0-28 days) (Depkes 2011). Hyperbilirubinemia term refers to high levels of bilirubin accumulates in blood and

marked with jaundice, a yellow coloring of the skin, sclera, and nails (Wong 2008). Hyperbilirubinemia is one problem that often occurs in newborns (Porter & Dennis 2002). Similarly, the further impact of hyperbilirubinemia is kernicterus. Although it is rare, it has a high significant mortality rate, which is approximately 10% and long-term morbidity of about 70% (Negroho et al 2006). The incidence of jaundice in newborns varies from one place to another. The incidence depends on the race and ethnicity. In western literature, found an increased incidence of hyper-bilirubinemia was found for 5 to 10 years (Negroho et al 2006). Premature babies often suffer from hyper-bilirubinemia than infants with weight in accordance with the age of pregnancy. Low weight premature infants are less than regular babies, possibly due to impaired liver growth (Surasmi et al 2003).

In Indonesia, the incidence of jaundice in term infants in some teaching hospitals, including Dr. Cipto Mangunkusumo Hospital, Dr. Sardjito Hospital, Dr. Soetomo Hospital, and Dr. Kariadi Hospital, varied from 13.7% to 85%. Data from Dr. Kariadi Hospital in 2003 showed 12% incidence of neonatal jaundice in term infants, 78% is a physiologic jaundice. Neonatal deaths associated with hyperbilirubinemia treated to all neonates in 2003 at Dr. Sardjito Hospital and Dr. Kariadi Hospital Semarang was 24% (Sareharto 2010). The incidence of hyperbilirubinemia in Dr. Soetomo Hospital in 2002 was 9.8% and then increased to 16.66% in 2003.

Bilirubin is a breakdown product of heme called indirect bilirubin, which is in a state of physiological levels <10 mg/dl. At levels >20 mg/dl, bilirubin can penetrate blood-brain barrier and is toxic to brain cells. Severe hyperbilirubinemia can suppress of O₂ consumption and suppress oxidation of phosphorylation, causes permanent damage to brain cells, caused neuronal dysfunction, encephalopathy and is known as kern icterus. Those infants in such condition are at risk of death or disability in later life (Wibowo 2007). Given the high cases of neonatal hyperbilirubinemia, this study aims to find out how the treatment of neonates with hyperbilirubinemia in Dr. Soetomo Hospital is expected to be used as a basis for improving services, especially in patients with hyperbilirubinemia that does not give further effect.

MATERIALS AND METHODS

This study was a descriptive study using secondary data in the form of medical records of patients with hyperbilirubinemia in neonatal patients undergoing hospitalization at Department of Pediatrics, Dr. Soetomo Hospital, Surabaya, in 2010. The data were about sex, birth status, birth weight, total bilirubin levels, phototherapy treatment, and the outcome of phototherapy treatment. The sample size of this study was 100 samples with inclusion criteria the total serum bilirubin levels ≥ 5 mg/dl. Samples were taken by using a non-probability/consecutive sampling. Obtained data were manually tabulated and analyzed with descriptive statistics.

RESULTS

Neonates with hyperbilirubinemia in 2010 were 823 patients. Neonates in Dr. Soetomo hospital in 2010 were 1257 patients. Retrieved incidence of neonatal hyperbilirubinemia in Dr. Soetomo Hospital in 2010 was

65%. This study used 100 samples of neonates hyperbilirubinemia.

Table 1. Baseline characteristic of study sample (n=100)

| Characteristic | n | % |
|-------------------------|-----|-----|
| Gender | | |
| Male | 55 | 55 |
| Female | 45 | 45 |
| Birth Status | | |
| Premature | 24 | 24 |
| Aterm | 75 | 75 |
| Postterm | 1 | 1 |
| Birth Weight | | |
| <1000 g | 0 | 0 |
| 1000-1500 g | 1 | 1 |
| 1500-2000 g | 18 | 18 |
| 2000-2500 g | 20 | 20 |
| >2500 g | 56 | 56 |
| No record | 5 | 5 |
| Total Bilirubin Levels | | |
| 5-10 mg/dl | 59 | 59 |
| 10-15 mg/dl | 33 | 33 |
| 15-20 mg/dl | 7 | 7 |
| >20 mg/dl | 1 | 1 |
| Treatment | | |
| Exchange Transfusion | 0 | 0 |
| Phototherapy Given < 24 | 32 | 32 |
| Given < 24 hours | | |
| Given > 24 hours | 68 | 68 |
| Outcome | | |
| Cured | 100 | 100 |
| Complication | 0 | 0 |
| Dead | 0 | 0 |

DISCUSSION

From this study, we found 55 male hyperbilirubinemia neonatal patients (55%) and 45 female hyperbilirubinemia neonatal patients (45%). This results are suitable with other study which found that one risk factor for neonatal hyperbilirubinemia was male sex (Porter & Dennis 2002). It can be caused due to the deficiency of G6PD (Glucose 6-Phosphate Dehydrogen-ase) which mostly occur in male neonates than female (Hussain et al 2010).

This study results only had little difference with Wibowo's study that found 35.6% premature infants, 62.4% aterm infants, and 2% postterm infants (Wibowo 2007). This may be because the incidence of premature infants is lower than term infants. However, there are differences with a previous study. This previous study found that hyperbilirubinemia occurred more frequently and for longer time in late-preterm infants (infants birth

at 34 0/7 weeks to 36 6/7 weeks of gestation) than term infants, because of the delay in the maturation of late-preterm infants and low concentrations of uridine glucuronosyltransferase diphosphoglucuronate. Late-preterm infants have twice higher chance than term infants to undergo significant increase in bilirubin concentration and has a higher concentration at 5-7 days after birth (ACOG 2008).

This study results only have little difference with the results of Arimbawa's et al study which has an average weight of 3181.3 grams with a standard deviation of 342.26 (Arimbawa et al 2006), also on Wibowo's who obtained 9.9% of infants with weight <1000 g, 33.7% of infants with weight 1500g - 2500 g, and 56.4% of infants with weight >2500 g (Wibowo 2007). This is suitable with the finding in this study where highest percentage was in infants with weight >2500 g. In aterm infants and those with sufficient weight, hyperbilirubinemia often occurs.

From the results above it can be observed that the majority of neonates with hyperbilirubinemia patients hospitalized at Dr. Soetomo Hospital had a total bilirubine levels in the range of 5-20 mg/dl. The different results obtained from studies conducted in Dr. Kariadi hospital Semarang who had higher levels of total bilirubin in the range of 10-38 mg/dl (Hutahaean 2007). This variation was because the illness suffered by neonatal patients, eg, sepsis, acidosis, asphyxia, and etc. increases serum's bilirubin levels. It also can be caused by breastfeeding that increases total serum bilirubin. The jaundice caused breast milk was not known for definitely, but there is a theory which states that a substance in breast milk that is β -glukoronidase and nonesterification fatty acids will inhibit the metabolism of bilirubin (Depkes 2010).

This study revealed different results from the study conducted by Sgro et al. From 258 patients suffering from hyperbilirubinemia, 257 patients (99.6%) received phototherapy and 57 patients (22.1%) received exchange transfusion (Sgro et al 2006). However, the results of this study were in line with the research conducted in the neonatal intensive care unit at William Beaumont Hospital, Michigan, where there was no exchange transfusion to 2425 infants who had birth weight >1.500 g (Maisels & McDonagh 2008).

In the literatures, most neonates will receive phototherapy when total bilirubin serum reaches 12 mg/dl. However, in this study, most patients with neonatal total bilirubin levels less than 12 mg/dl had already been given with phototherapy. This may be influenced by the severity of the major cause of disease, the neonatal hyperbilirubinemia. Thus, the patients were directly

subjected to phototherapy. It can be seen from the length of phototherapy given to neonatal patients that 68% of them earn more than 24 hours of phototherapy. Thus, the exchange transfusion treatment to lower serum bilirubin concentration was not performed because exchange transfusion is carried out only on the condition that significant hyperbilirubinemia in serum bilirubin concentration is over 20 mg/dl and if intensive phototherapy does not provide optimal results in lowering serum bilirubin levels (Depkes 2010).

This study showed that all treated neonates with hyperbilirubinemia healed (100%). No complications were suffered from hyperbilirubinemia and no dead patients, even though a study found 2% of the patients died and 12% experienced complications after exchange transfusion treatment was given (Dennery et al 2001). This difference may be due to the absence of patients who were given with exchange transfusion in this study. The use of exchange transfusion have severe complications even may lead to death, thus, intensive phototherapy should be given first before switching to exchange transfusion (Depkes 2010).

CONCLUSION

Treatment administered to patients with neonatal hyperbilirubinemia was phototherapy >24 hours in 68 patients (68%) and phototherapy of <24 hours in 32 patients (32%). All neonates with hyperbilirubinemia receiving treatment phototherapy healed.

REFERENCES

- ACOG (2008). Late-preterm infants. Available from <http://www.acog.org/Resources%20And%20Publications/Committee%20Opinions/Committee%20on%20Obstetric%20Practice/Late-Preterm%20Infants.aspx>. Accessed January 22, 2012
- Arimbawa IM, Soetjningsih, Kari IK (2006). Adverse effects of hyperbilirubinemia on the development of healthy term infants. *Paediatrica Indonesiana* 47, 51-56
- Dennery PA, Seidman DS, Stevenson DK (2001). Neonatal hyperbilirubinemia. *N Engl J Med* 344, 581-590
- Depkes (2010). Buku panduan tatalaksana bayi baru lahir di rumah sakit. Available from http://buk.depkes.go.id/index.php?option=com_docman&task=doc_download&gid=287&Itemid=53. Accessed Mei 18, 2011
- Depkes (2011). Materi advokasi bayi baru lahir. Available from <http://www.gizikia.depkes.go.id/wp-content/uploads/downloads/2011/01/Materi-Advokasi-BBL.pdf>. Accessed Mei 18, 2011

- Hussain M, Irshad M, Kalim M, Ali L, Ali L (2010). Glucose-6-phosphate dehydrogenase deficiency in jaundiced neonates. *JPMI* 24, 122-126
- Hutahaean BP (2007). Gangguan perkembangan neurologis pada bayi dengan riwayat hiperbilirubinemia. http://eprints.undip.ac.id/16667/1/Baginda_P_Hutahaean.pdf. Accessed Juni 6, 2011
- Maisels MJ and McDonagh AF (2008). Phototherapy for neonatal jaundice. *N Engl J Med* 358, 920-928
- Negroho AWP, Ismail D, Surjono A (2006). Pengaruh hiperbilirubinemia pada neonatus cukup bulan terhadap perkembangan anak usia 3-5 tahun. *Sains Kesehatan* 19, 1-10
- Porter ML and Dennis BL (2002). Hyperbilirubinemia in the term newborn. *Am Fam Physician* 65, 599-606
- Sareharto TP (2010). Kadar vitamin E rendah sebagai faktor risiko peningkatan bilirubin serum pada neonatus. Masters Thesis. Universitas Diponegoro, Indonesia
- Sgro M, Campbell D, Shah V (2006). Incidence and causes of severe hyperbilirubinemia in Canada. *CMAJ* 175, 587-590
- Surasmi A, Handayani S, Kusuma HN (2003). Perawatan Bayi Risiko Tinggi, Jakarta, EGC
- WHO (2005). Newborn Health Policy and Planning Framework. Available from http://www.who.int/cchild_adolescent_health/documents/pdfs/newborn_health_policy_and_planning_framework.pdf. Accessed Mei 31, 2011
- Wibowo S (2007). Perbandingan kadar bilirubin neonatus dengan dan tanpa defisiensi glucose-6-phosphate dehydrogenase, infeksi dan tidak infeksi. Masters Thesis. Universitas Diponegoro, Indonesia
- Wong DL (2008). Buku Ajar Keperawatan Pediatrik Vol 1, Jakarta, EGC