Ibuprofen vs. Indomethacin in Treatment of PDA Closure: An Integrative Research Review

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**BACKGROUND AND SIGNIFICANCE**

- Patent ductus arteriosus is a congenital disorder in neonates in which the vessel fails to close after birth and remains patent or open (Jinmiao et al., 2017).
- Delayed closure of ductus arteriosus (PDA) in preterm infants under 28 weeks is associated with high incidence of pulmonary morbidity, intraventricular hemorrhage (IVH), necrotizing enterocolitis (NEC), chronic lung disease and high mortality (Bhat & Das, 2015).
- Therefore, closure of the PDA is essential to prevent both cardiorespiratory status and survival rate (El-Mashad, El-Mahdy, El Amrousy, Eldergy, & El-Mashad, 2017).
- Initially indomethacin was the drug of choice for treating PDA; however it can affect renal, gastrointestinal and cerebral organs. These complications can lead to transient or permanent renal dysfunctions, necrotizing enterocolitis, gastrointestinal hemorrhage and reduced cerebral intracranial oxygenation (Yang et al., 2013).
- Ibuprofen was introduced and approved by the FDA as an alternative agent in April 2006 for closure of PDA in premature infants (Yang, Song & Choi, 2013).

**METHODOLOGY**

An integrated review of the literature was conducted using the methodology described by Whittemore and Knafli (2005) and Brown (2018).

- Cochrane, CINAHL, Medline Complete and Pub Med were searched using the following key terms “ibuprofen”, and “indomethacin”, and “patent ductus arteriosus”.
- Search criteria was limited to “full text articles assessed for eligibility (n = 45)”. 
- Studies included in qualitative synthesis (n = 42)
- Studies included in quantitative synthesis (meta-analysis) (n = 10)

**RESULTS**

- Seventy articles were initially identified; twelve included in final sample.

**RESEARCH QUESTION**

“Does Ibuprofen compared to Indomethacin have the same efficacy with fewer adverse effects in treating patent ductus arteriosus in a preterm infant?”

**LITERATURE SEARCH FLOW**

Records identified through database searching (n = 710)
Records after duplicates removed (n = 230)
Records screened (n = 48)
Full-text articles assessed for eligibility (n = 45)
Studies included in qualitative synthesis (n = 42)
Studies included in quantitative synthesis (meta-analysis) (n = 10)

**LITERATURE SYNTHESIS**

- Ibuprofen was found to as effective as indomethacin for successful treatment of PDA closure. This was noted by Ohlsson et al., El-Mashad et al., ElHassan et al., Chan et al., Pacifici et al., Gulack et al., Loomba et al., Yang et al. (2015, 2017, 2014, 2014, 2014, 2015, 2015, 2013).
- Ibuprofen had fewer side effects than indomethacin but showed to have significant increase in serum bilirubin levels (ElHassan et al., 2014).
- Ohlsson et al., Malikiwi et al., ElHassan et al., Pacifici et al., Loomba et al., Yang et al., all found ibuprofen groups had lower creatinine levels and reduced risk of oliguria compared to those treated with indomethacin (2015, 2014, 2014, 2015, 2013).
- Ibuprofen groups did however have more pulmonary hypertension compared to those in the indomethacin group. This was noted by Malikiwi et al., ElHassan et al., (2015, 2014).
- Jinmiao et al., Mitra et al., found high dose oral ibuprofen was more effective in closure of PDA compared to IV ibuprofen and IV indomethacin, but more studies are needed to determine long term adverse effects (2017, 2018).

**CLINICAL IMPLICATIONS**

- Ibuprofen is shown to be as effective as indomethacin in treatment of PDA closure. 
- Ibuprofen does show to have fewer adverse effects although both medications do come with significant adverse effects.

**CONCLUSION**

- Results of this literature have shown ibuprofen is as effective as indomethacin in PDA closure.
- However the adverse effects have not been proven to be majorly different. Further level 1 evidence research is needed to determine the safest medication for treatment in PDA closure.

**REFERENCES**

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