SHOULD CHILDREN WITH DOWN SYNDROME RECEIVE PROPHYLACTIC ANTIBIOTICS TO PREVENT RECURRENT RESPIRATORY INFECTIONS?

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Introduction Trisomy 21, also known as Down syndrome (DS), is a clinical disorder where a third copy of chromosome 21 is present. Approximately 95% of DS are due to a meiotic nondisjunction, with the remaining 5% caused by chromosomal translocation or mosaicism. Children with DS are predisposed to recurrent respiratory infections due to a number of anatomical and immunological features. Our project investigated whether there is evidence supporting or refuting the use of antibiotic prophylaxis for recurrent respiratory infections in the DS population.

Methods A systematic literature review was conducted of published medical literature within the following databases: MEDLINE, Science Direct, and The Cochrane Library. A systematic search for ongoing clinical trials and guidelines/consumer statements was performed using various clinical trial registers and professional organisation websites. Search terms included ‘DS’, ‘Trisomy 21’, ‘paediatric’, ‘respiratory infections’, ‘recurrent respiratory infections’, ‘ prophylaxis’ and ‘antibiotics’. Systematic reviews, meta-analyses, randomised controlled trials, case-control studies and case-series were considered.

Results A systematic search revealed 0 published articles and 0 clinical trials meeting the necessary inclusion criteria. 1 guideline was found meeting our inclusion criteria; the Nottingham Guideline which outlines the role of prophylactic antibiotics in the DS population. Given the dearth of evidence in this area, we formulated a clinical trial to investigate the utility of prophylactic antibiotics for current respiratory infections in the DS population. Azithromycin was chosen as the antibiotic of choice for its anti-inflammatory and immunomodulatory properties. Primary endpoints would be the number of respiratory infections experienced over the course of the treatment period requiring a GP or ED attendance. Secondary endpoints include the severity of respiratory infections, both the number and severity of adverse events experienced over the period of the trial, along with the patient and parent/legal guardian self-reported quality of life.

Conclusion There is a current lack of evidence supporting or refuting the use of prophylactic antibiotics for recurrent respiratory infections in DS. Basic scientific studies need to be performed elucidating the role of anatomical and immunological features in predisposing children with DS to recurrent respiratory infections. Clinical trials are needed to elucidate whether prophylactic antibiotics are useful in this cohort and to investigate the optimal timing and combination of antibiotics. Guidelines are needed to support physicians in clinical decision making.
The study aims to compare long-term effects of artificial lung ventilation sustained in the neonatal period in dependence on newborn babies’ gestational age and the mechanical parameters of ventilation.

Materials 127 patients aged 8–11 (84 full-term babies, 43 premature babies) who were treated in the intensive care unit of St. Petersburg Children’s Hospital No. 1 in the neonatal period, underwent follow-up examination of respiratory system. Of them, 27 children were born with the gestational age of 30–34 weeks, 16 of 35–36 weeks, and 84 at the gestational age of 37–42 weeks. The control group consisted of 43 children with uncomplicated neonatal period.

Results In the neonatal period, pathology of the respiratory system was detected much more often in the premature infants (56% and 88%; p < 0.001). They developed 1st type respiratory distress syndrome (45%) more often than the full-term infants, while the amniotic fluid aspiration syndrome was detected in the full-term newborns more often than in the premature ones (36%). Transient tachypnea of the newborn was significantly more frequent in the group of full-term infants (28% and 8%; p = 0.026). Among infants with bronchopulmonary pathology, pneumonia developed in preterm babies more often (32% and 60%; p = 0.009). According to a follow-up survey, the incidence of pulmonary healthy children was comparable in the group of full-term children (74%) and in the control group (84%) at school age, while prematurely born children developed no bronchopulmonary pathology less often (63%, p = 0.05). Besides, prematurely born children with recurrent bronchitis developed neonatal pneumonia reliably more often (p < 0.05). All prematurely born children who developed recurrent bronchitis or chronic nonspecific lung diseases at school age (100%) had been on ALV with ‘hard’ settings in the neonatal period, whereas the same indicator among full-term infants was twice lower (50%). Family history analysis showed that family history of bronchopulmonary diseases accompanied bronchial asthma in most cases, both in full-term (67%) and premature children (63%).

Conclusions Neonatal pneumonia, along with iatrogenic effects of resuscitation, is the dominant factor in formation of chronic nonspecific pulmonary diseases in catamnesis. Children treated in ICU in the early neonatal period should be considered a high-risk group for development of bronchopulmonary system pathology later in life, and they must be carefully supervised by pediatrician and pulmonologist.

References
2. AAP bronchiolitis guidelines published in 2006 and updated in 2014 recommended supportive care with limited diagnostic testing and treatment. To comply with the international guidelines in 2014 we’ve started a campaign to improve the therapeutic practice of bronchiolitis at our hospital.

Aim To assess the effect of the therapeutic regime changes on the morbidity of bronchiolitis (need of PICU transmission, length of hospital stay) at our hospital.

Methods The data of 225 patients, aged 1-12 months, hospitalized in the period of April to October between 2013 and 2018 with the diagnosis of bronchiolitis at our Pulmonology Unit was analysed retrospectively.

Results Antibiotic treatment application decreased since 2013 in each year (In 80%–36%–27%–12%–2% of the patients respectively). Same as the antibiotic use, the systemic corticosteroid and inhalative B2 agonist administration decreased significantly (60% – 28% – 17% – 2% – 0% and 80% – 39% – 40% – 13% – 14% of the cases). Use of 3% saline inhalation increased: 30% – 39% – 93% – 93% – 95%. Although the use of drug therapies decreased during the observational period, it did not cause an increase either in the length of hospital stay (median days 6.4 – 6.3 – 6.9 – 4.5 – 5.0) or in length of hospital stay (median days 6.4 – 6.3 – 6.9 – 4.5 – 5.0) or in length of hospital stay (median days 6.4 – 6.3 – 6.9 – 4.5 – 5.0).