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Are Gene polymorphisms of Fibroblast Growth Factor 10 associated with Patent Ductus Arteriosus and Bronchopulmonary Dysplasia in extremely low birth weight infants?

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Background

**FGF10 expression and lung bud morphogenesis**

- Informed parental consent
- Required for distal lung branching differentiation of the progenitors and colonization of the cardiac outflow tract.
- FGF10 is also an integral part of the signaling colonizing the cardiac outflow tract.
- cyclic stretch and oxidant injury via DNA repair.
- It regulates the mitogen activated protein kinase (MAPK) pathway, in turn activates the Na-K-ATPase in AEC - protein responsible for fetal lung fluid resorption and lung morphogenesis in fetus.
- It causes significant morbidity in the ELBW infants.
- Defined as an oxygen need at 36 weeks postmenstrual age.
- Incidence is about 40% for ELBW infants.

**FGF10 signaling pathway**

- Roles of FGF 10 – Fibroblast growth factor 10 (FGF10) plays a significant role in cardiac outflow tract formation and possible PDA. Downregulation of the FGF/Ras/Erk pathway are important for the differentiation of the progenitors and colonization of the cardiac outflow tract.
- FGF10 is also an integral part of the signaling required for distal lung branching morphogenesis in fetus. It is an alveolar epithelial cell (AEC) mitogen protects against cyclic stretch and oxidant injury via DNA repair. It regulates the mitogen activated protein kinase pathway (MAPK) that, in turn activates the Na-K-ATPase in AEC - protein responsible for fetal lung fluid resorption and β2 receptor mediated actions.

**FGF10 expression and lung bud morphogenesis**

- Altered lung development and immunity
- Predisposition to BPD
- External noxious stimuli: MV, ROS

**FGF10 SNP Analysis**

- Stratification of the study groups was performed using the Student’s t-test, chi-square, Mann-Whitney, and z-test for the presence of FGF10 SNP rs2973644, rs900379, and rs1011814.

**Conclusions**

- Low birth weight and gestational age was associated with BPD
- FGF10 SNP ; rs2973644, rs900379, rs1011814 were not associated with PDA and or BPD.
- Other SNPs may be involved in the susceptibility of PDA or BPD.

**Methods**

- Inclusion criteria:
  - ELBW infants (birth weight < 1kg)
  - Informed parental consent

- FGF10 SNPs Analysis:
  - DNA was isolated from buccal swabs and real-time PCR was performed using Taqman probes

- FGF10 SNP rs2973644
  - Wild allele: 9(31%)
  - Heterozygous: 14(28%)
  - Minor allele: 7(24%)

- FGF10 SNP rs900379
  - Wild allele: 42(56%)
  - Heterozygous: 23(31%)
  - Minor allele: 10(14%)

- FGF10 SNP rs1011814
  - Wild allele: 15(50%)
  - Heterozygous: 20(37%)
  - Minor allele: 9(16)

**References**


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