



CHR D 2022: Abstract & Poster Submission Form

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Presenter Status

- Undergraduate Students
- Masters Student
- PhD Student
- Post-Doctoral Fellows
- Residents
- Non-Trainee

Research Category

- Basic Science
- Clinical
- Community Health / Policy

Role in the project

- Design
- Perform Experiments
- Analyze Data
- Write Abstract

Title

A Novel lung explant model to study the effects of tracheal occlusion for congenital diaphragmatic hernia

Background

Fetal tracheal occlusion (TO) improves survival in fetuses with severe congenital diaphragmatic hernia (CDH). To better understand TO, many animal models have been developed, but each model requires fetal operation and the survival rates are low. Here, we aimed to establish a novel tracheal occlusion model using lung explants.

Objective

We extracted lungs from two rats with nitrofen-induced CDH on embryonic day 18.

Methods

We mimicked TO in the lung explants by tying the trachea with a surgical suture. We checked lung weight, air spaces of lungs, and immunofluorescence using anti-Ki-67 and anti-Active caspase-3 antibodies. We also evaluated the expression of prosurfactant protein C (SPC). The % Ki-67/DAPI+ and active caspase-3/DAPI+ were calculated. SPC protein abundance was defined as the mean gray value of the immunostained images.

Results

Lung weight gain was significantly higher on day1 (1.12 vs. 1.19, $p=0.030$) and significantly lower on day2 (1.09 vs. 0.97, $p=0.013$) in TO lungs (TO+) than non-TO lungs (TO-), and air spaces of lungs were significantly higher in TO+ than TO- (34.3% vs. 44.1%, $p=0.0258$ for day1, 30.7% vs. 39.1%, $p=0.0172$ for day2, 27.2% vs. 39.6%, $p=0.0115$ for day3, respectively). % Ki-67/DAPI+ were significantly higher in TO+ than TO- ($p=0.009$ for day1, $p=0.004$ for day2, $p=0.044$ for day3, respectively), and % Active caspase-3/DAPI+ were significantly higher in TO+ than TO- on day2 and day3 ($p<0.001$ for day2, $p=0.008$ for day3, respectively). However, SPC protein abundance was significantly lower in TO+ than TO- ($p=0.033$ for day1, $p=0.038$ for day2, $p=0.009$ for day3, respectively).

Conclusion

The TO model in lung explants is easier to use with comparable outcomes to other current animal models of TO. Further studies with this model can reveal the cellular and molecular effects of TO in CDH lungs.

Do you have a table/figure to upload?

Yes No

TO model.pdf

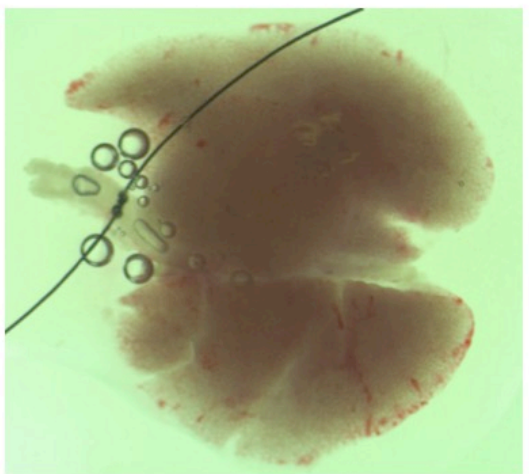
Authors

- For each author, please click "[+] Add Item" and provide the author's information

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Tracheal occlusion model



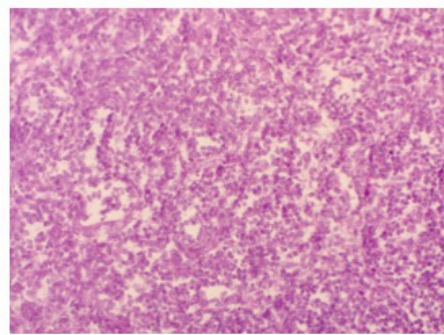
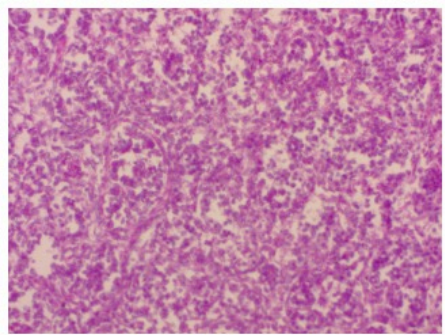
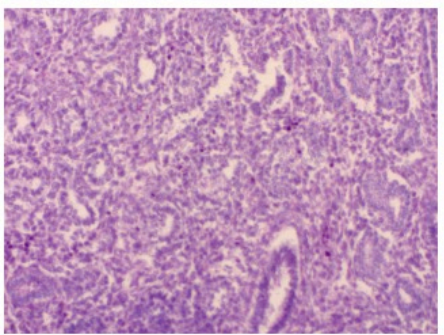
HE staining

day 1

day 2

day 3

TO -



TO +

