Children's Hospital Colorado

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Large Airway and Parenchymal Findings in Children and Young Adults with Down Syndrome

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Background

- Epidemiology studies report pulmonary disease, lung infection, and pneumonia as the largest causes of morbidity and mortality in individuals with Down syndrome (DS), but whether there are specific airway and parenchymal patterns remains unknown.

Objectives

- Our goal was to evaluate patterns of structural lung abnormalities in children and young adults with DS.

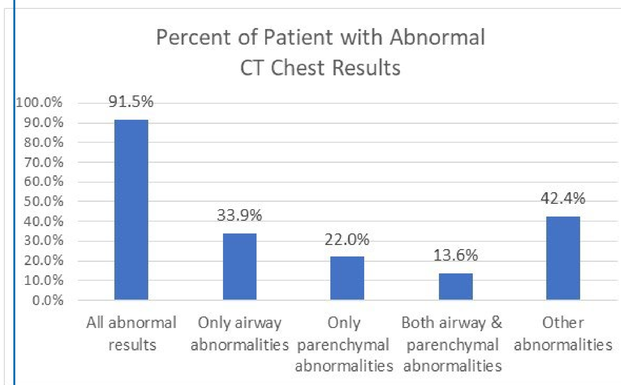
Methods

- Retrospective review of computed tomography (CT) chest scans conducted clinically between 2011-2020 merged with clinical data were conducted on individuals with DS (birth-22 years; n=59) treated at a single institution.
- Outcomes were categorized as airway and parenchymal findings.

Results

Abnormal CT results in 91.5% (55/59)children with DS

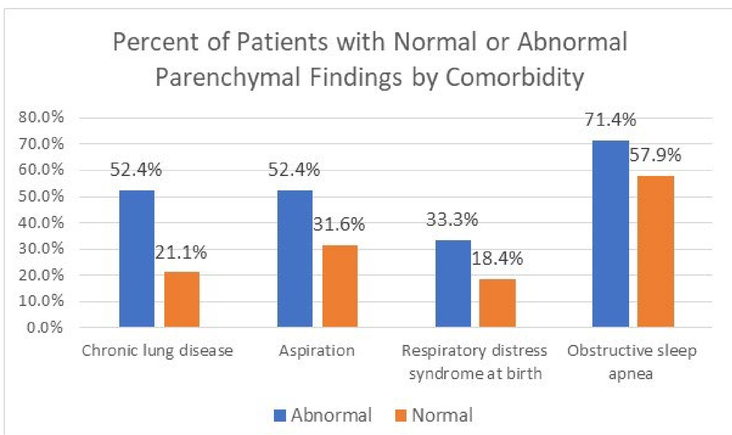
- Mean age at testing =7.06 years (SD=6.43)
- Clinical presentations :
  - Symptoms of large airway disease (n=18),
  - Lung disease/ (acute, chronic) (n=9,8)
  - cardiac defect (n=6),
  - swallow challenges (n=6),
  - hypoxemia/oxygen (n=4)
  - mass (n=2), other (n=4)



- Other: atelectasis (n=23) and effusion (n=5)

Medical Comorbidities Associated with Abnormal Findings

Patients with parenchymal findings were more likely to have a medical history of chronic lung disease (p=0.020; 52.4% vs. 21.1%) and a higher incidence of aspiration, respiratory distress syndrome at birth, and obstructive sleep apnea.
No differences were found in individuals with and without airway abnormalities.



Airway Findings

Overall, 47.5% of children with DS with a chest CT presented with airway abnormalities. Specific findings are listed in Table 1.

- Other airway findings included narrowing between aorta and right atria, perihilar lymphovascular proliferation, and repaired tracheoesophageal fistula.

Table 1 Abnormal airway findings

Findings	n (%)
Tracheal compression / vascular ring or aberrant vasculature	12 (20.3%)
Tracheobronchomalacia	8 (13.6%)
Tracheal bronchus	7 (11.9%)
Innominate compression	4 (6.8%)
Other airway	4 (6.8%)

Parenchymal Findings

Parenchymal findings occurred in 35.6% children with DS (Table 2)

- Other Parenchymal abnormalities included interstitial/reticular infiltrates, pneumonia, and bronchiectasis

Table 2 Abnormal parenchymal findings

Findings	n (%)
Cystic abnormality / lucencies or arch. distorsion	8 (13.6%)
Patchy or diffuse GGO	6 (10.2%)
Peribronchial thickening	6 (10.2%)
Nodules/tree in bud	6 (10.2%)
Other parenchymal	4 (6.8%)

Conclusions

- The moderate association between pulmonary diagnoses and parenchymal abnormalities creates concern that structural injury may be related to pulmonary morbidity.
- However, despite this risk of pulmonary morbidity and mortality, no consistent pattern of lung injury identified on clinically obtained chest CTs.

Implications

- Our data supports chest imaging because findings do not follow a predictable pattern. Contrast, when available, should be considered as vascular abnormalities are prevalent and may contribute to airway compression and symptoms.

Disclosures

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