Aortopexy with Concurrent Intraoperative Bronchoscopic Monitoring in Tracheomalacia

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Background

Tracheomalacia

- accompanied with esophageal atresia and tracheoesophageal fistula (~25 %)
- respiratory symptoms
- surgical indication
  severe respiratory symptom and chronic respiratory distress that can result in respiratory arrest
- treatment of choice
  surgical correction of the extrinsic compression, such as great vessels

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Purpose

report of our experiences and results of aortopexy in 7 infants
with tracheomalacia after correction of EA/TEF
in the last decade

Methods

retrospective review of medical records
aortopexy due to tracheomalacia
from 1997 to 2008
Severance Hospital and Yongdong Severance Hospital

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Results

- severe respiratory symptoms
- past history of correction of EA/TEF

1 – 11 months (median 2.5 months) ago

- respiratory difficulty from gastroesophageal reflux

was excluded by esophagography and 24hr pH monitoring

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Clinical Characteristics

Patient number	Sex	Diagnosis	Correction of TEF / EA
1	M	TEF / EA	at Severance H.
2	M	TEF / EA	at Severance H.
3	M	TEF / EA	at other hospital
4	M	TEF / EA	at other hospital
5	M	TEF / EA	at other hospital
6	M	TEF / EA	at other hospital
7	F	TEF / EA	at other hospital

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Diagnosis of Tracheomalacia

Patient number	Age of Dx. of TM & aortopexy (months)	Diagnostic tools of tracheomalacia	Level of tracheal narrowing on CT
1	1	bronchoscopy	-
2	2.5	bronchoscopy	-
3	3.5	bronchoscopy	-
4	11	3-D recon. CT bronchoscopy	innominate artery
5	4	3-D recon. CT bronchoscopy	double aortic arch
6	2	3-D recon. CT bronchoscopy	Rt. bracheocephalic a.
7	2	3-D recon. CT bronchoscopy	Rt. bracheocephalic a.

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Bronchoscopic Findings of Tracheomalacia

confirmation of tracheomalacia by bronchoscopic evalution
during patient's self respiration

Anterior Aortopexy of Tracheomalacia

left anterior thoracotomy in the third intercostals space

partial thymectomy for exposure of the space between aortic arch and sternum

under bronchoscopic monitoring
appropriate point to suspend the aorta or the innominate artery for maximal opening of collapsed tracheal lumen was decided

interrupted sutures on the determined point
between posterior side of sternum and anterior wall of the great vessel

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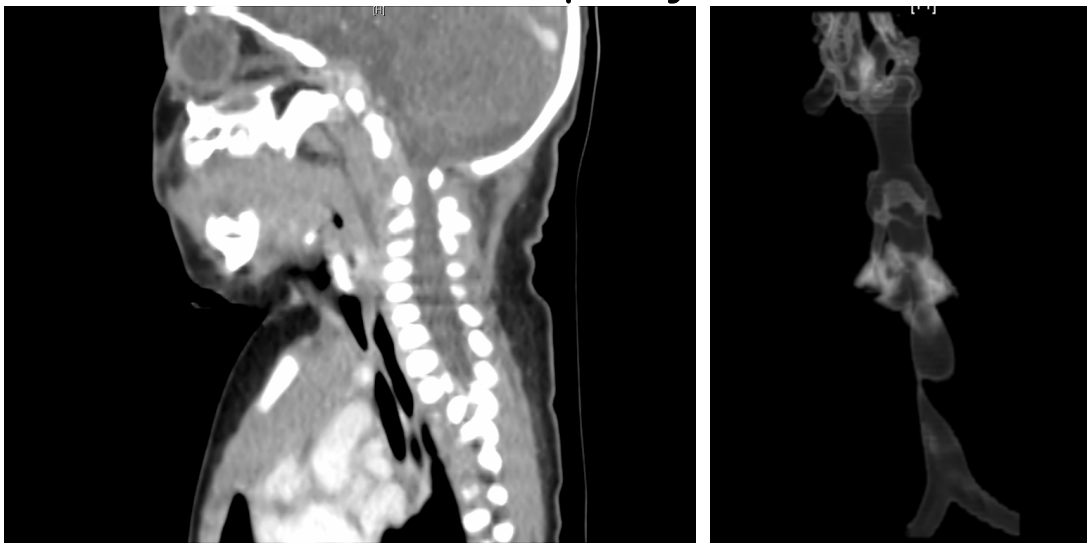
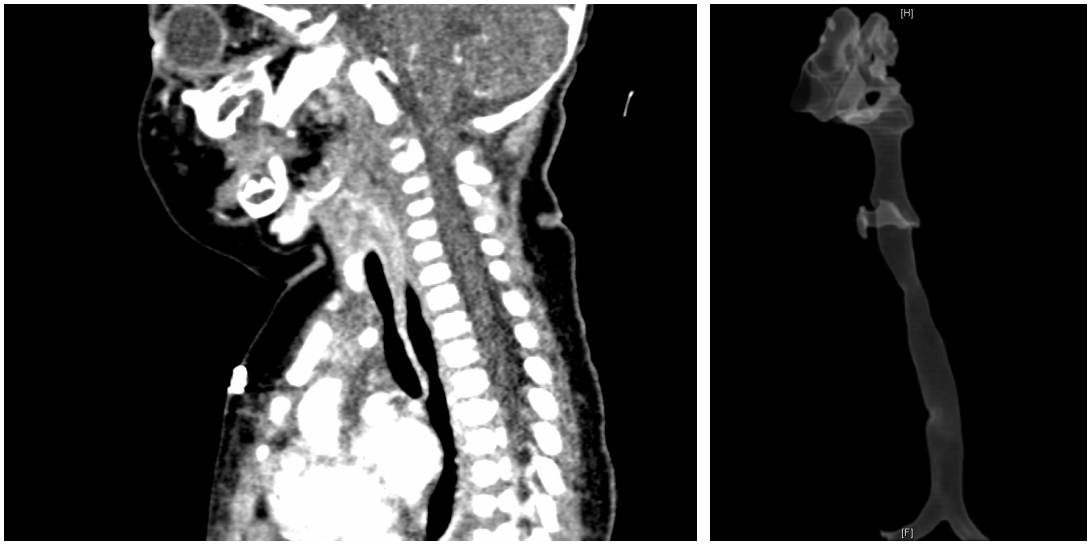
Improvement of Tracheal Luminal Narrowing on Neck CT after Aortopexy

Tracheal narrowing on preop. neck CT



Improvement of tracheal luminal narrowing on postop. neck CT



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Result of Aortopexy in Tracheomalacia

Patient number	Concurrent bronchoscopic monitoring	Redo operation of aortopexy	Postop. complication	Duration of admission after aortopexy (days)	Duration of follow up (months)
1	No	Yes	Yes[1)]	55 / 39[3)]	11 yrs
2	Yes	No	No	21	10 yrs
3	Yes	No	Yes[2)]	51 / 35[3)]	2
4	Yes	No	No	8	27
5	Yes	No	No	10	4
6	Yes	No	No	7	4
7	Yes	No	No	8	2

1) no correction of tracheomalacia; Re-do operation of aortopexy
2) Eventuation of Lt. diaphram; Diaphragmatic plication
3) after second operation

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Results

After aortopexy, respiratory symptoms were relieved in all patients except two cases accompaning postoperative complications.

Complicated Case I

Concurrent bronchoscopy was not performed during aortopexy.
After anterior suspension of aorta to the posterior aspect of sternum, bronchoscopic evaluation was performed confirming relief of tracheal luminal narrowing.
But he was not tolerate with weaning of respiratory ventilator, and was re-operated.
After re-do operation, extubation was tolerable without respiratory distress.

Complicated Case II

With self respiration, Lt. diaphragmatic eventuation was noted.
Lt. phrenic nerve injury during aortopexy was suspected.
After plication of Lt. diaphragm, weaning and extubation were tolerable without respiratory symptoms.

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Conclusion

I. Anterior suspension of the aorta or the innominate artery
to the posterior aspect of the sternum
: relief of the tracheal cartilage
from the extrinsic vascular compression
: improvement of respiratory distress in tracheomalacia

II. Concurrent intraoperative bronchoscopic monitoring
is mandatory in the anterior aortopexy of tracheomalacia
to find the correct site of extrinsic vascular compression
responsible for narrowing of tracheal lumen in tracheomalacia.

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