CRICOPHARYNGEAL DYSFUNCTION AND RECURRING BRONCHITIS OF INFANTS

Preliminary report

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Abstract

Cricopharyngeal dysfunction (CPD) and cricopharyngeal achalasia (CPA) are known first of all as disorders causing swallowing difficulties. Frequent aspiration pneumonia was reported but mainly in different neurological disease entities as cerebral palsy, myasthenia gravis, Prader-Willi syndrome or familiar Rieley-Day syndrome.

However according to our experiences the innervation disorder caused by the immaturity of the cricopharyngeal muscle can result in and can temporarily maintain recurring bronchitis during infancy without any other abnormality. The immediate reason for this is the improper relaxation of the cricopharyngeal muscle and the tracheal aspiration of different severity.

Key words: cricopharyngeal dysfunction, cricopharyngeal achalasia, recurring bronchitis, infancy, tracheal aspiration.

Purpose of this publication is to draw attention to the fact that recurring obstructive bronchitis of infants can be caused by the joint occurrence of CPA and GER as well. Radiological examinations have an important role to reveal them and have therapeutical consequences too.

Patients and methods

More than 2000 children (age: 0-18) are taken care of yearly at the 1,1 Department of Pediatrics at Heim Pál Children's Hospital. 25 % of the patients are admitted with obstructive bronchitis or bronchial asthma (Table 1.).

In accordance with the practice developed in our hospital detailed check-up is given in case of recurring obstructive respiratory disorder and in status asthmaticus also when young infants (under 6 months) present with obstructive bronchitis and/or stridor.

In compliance with the international standard the check-up is aimed at the exploration of organic and immunological pathology (Table 2-3.).

Table 1. CPD in recurring bronchitis of infants
(01.01.98. - 01.12.98.)

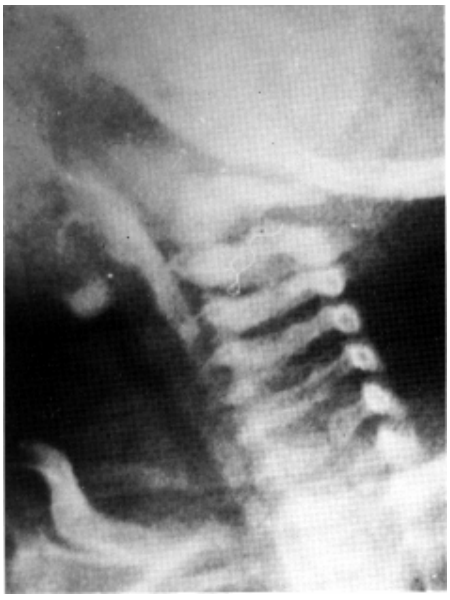
Number of patients: 197 (female: 105, male: 92) Age: 0-3 months : 24
3-6 months: 67
6-12 months: 106
Contrast swallow examinations: 182 (female: 101, male: 81) Age: 0-3 months: 12
3-6 months: 93
6-12 months: 77
Cricopharyngeal dysfunction: 58 (female: 34, male: 22) Age: 0-3 months: 9
3-6 months: 28
6-12 months: 21 Concomittant diseases: GER: 46
Stenosis bronch.: 1

The diagnosis of organic diseases as vascular ring, tracheo-esophageal fistula and in some cases gastroesophageal reflux (GER) is made by contrast swallow. In the course of these examinations indicated by the above mentioned disorders we observed that in some cases the radiological picture characteristic to CPD and CPA appeared (Fig. 1 a-b.).

These children are not effected by aspiration pneumonia or severe airway failure, the only symptom was a recurring obstructive bronchitis that healed with difficulty despite adequate treatment.

For one and a half years the examinations have been carried out at the Department of Radiology of the hospital using the Mercury Plus, VDR 2000 digital equipment. The equipment's technical features as good definition, the availability of digital postprocessing made it possible to diagnose disorders such as cricopharyngeal dysfunction, achalasia and incoordination that we could diagnose very rarely up to that time.

For the contrast swallows water soluble non-ionic contrast media (Omnipaque) - less often barium-suspension - is used.


a

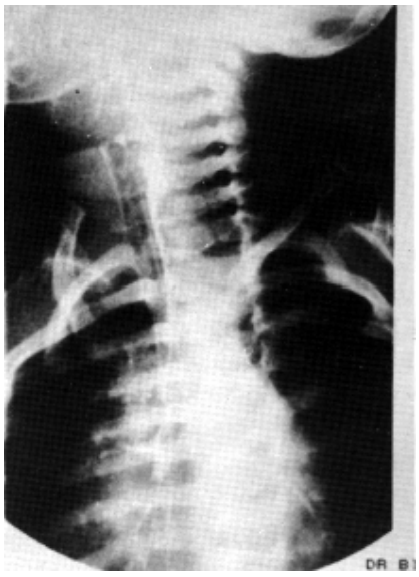

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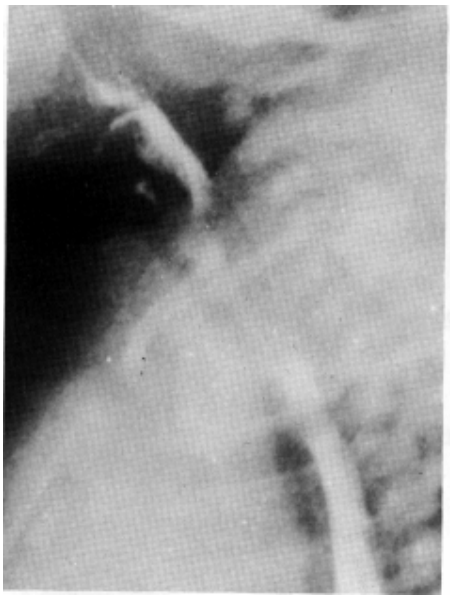
Fig. 1. a: Mild tracheal aspiration-CPD; b: Severe, chronic aspiration-CPA.

Special attention is paid in examining the level of the cricopharyngeal muscle and the upper esophageal sphincter and the first - few millimeters - along portion of the trachea (Fig. 2-3.). Characteristic radiological abnormalities: tracheal aspiration, indicated by contrast media in the dorsal third of the trachea's first portion, and the esophageal "narrowing" of different degree, caused by the thickening and improper relaxation of the upper esophageal sphincter (Fig. 4.). In some countries the disorder is examined by manometry and videomanometry as well [1].



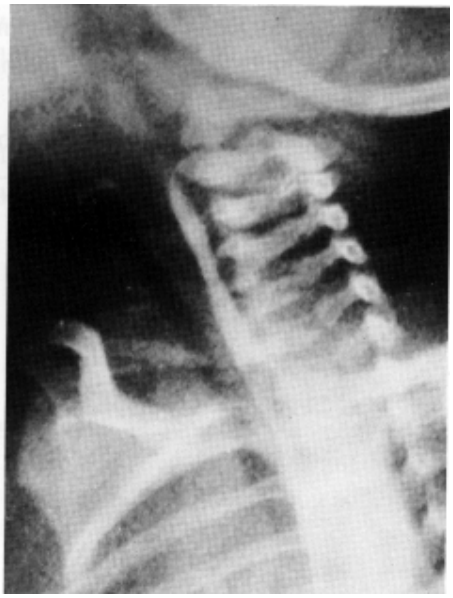


Fig. 2., 3.

Fig. 2: Contrast material in the first, dorsal portion of the trachea-CPD.

Fig. 3: Tracheal aspiration into the first tracheal portion-CPD.

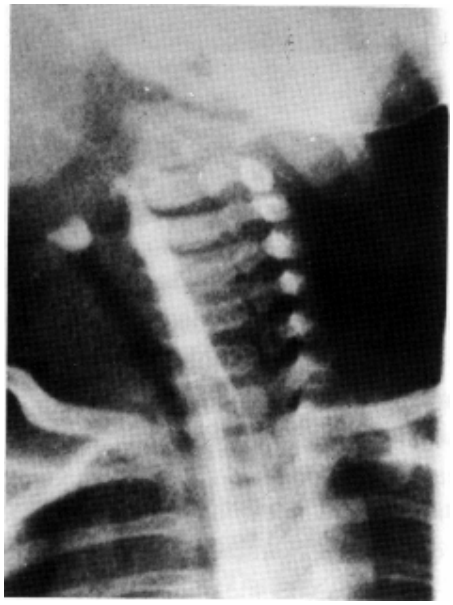


Fig. 4: CPD-thickening and improper relaxation of the upper esophageal sphincter.

Discussion

There has been limited knowledge so far about the reasons for the abnormal function of the cricopharyngeal muscle. (First described by Chevalier Jackson in 1915.)

The terminology of certain disorders is diverse as we11. The most characteristic picture of cricopharyngeal dysfunction is caused by achalasia, that is the spasm of the cricopharyngeal muscle. According to several authors the so called "cross-roll" sign, or cricopharyngeal bar (Fig. 5.a-b.) that is a deep impression of the dorsal contour of the esophagus made by the cricopharyngeal muscle, is not a manifestation of a disorder, while others state that this is characteristic to the spasm of the cricopharyngeal muscle, cricopharyngeal achalasia [3,4,5]. We would think that the immediate reason of cricopharyngeal dysfunction is the improper relaxation of the (immaturity) cricopharyngeal muscle and the tracheal aspiration of different severity (Fig. 6.a-b.) the reason of CPA is a "real" spasm of cricopharyngeal muscle with very severe tracheal aspiration (Fig. 7.) CPD is more frequent, than we have thought before, but cricopharyngeal achalasia is a rare disease.

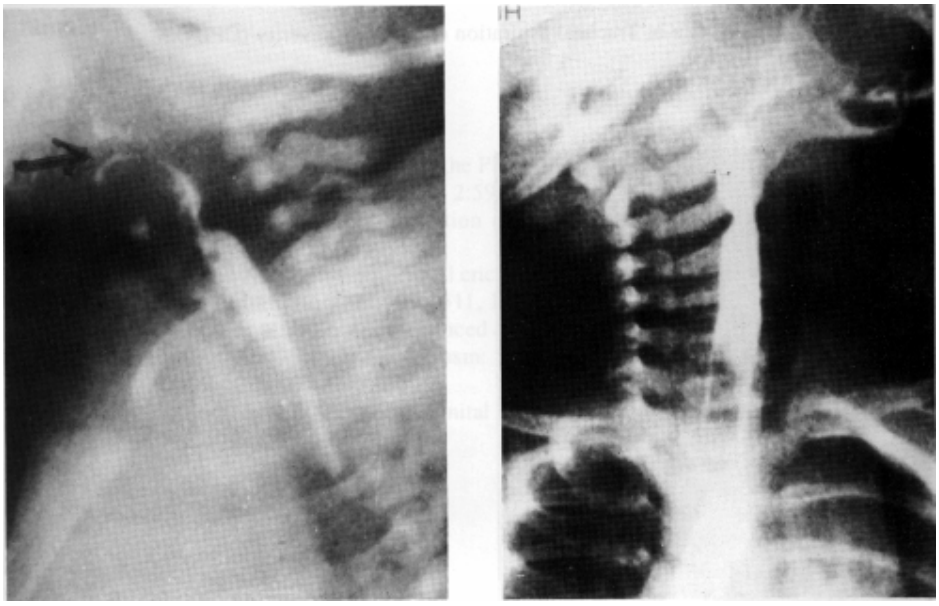
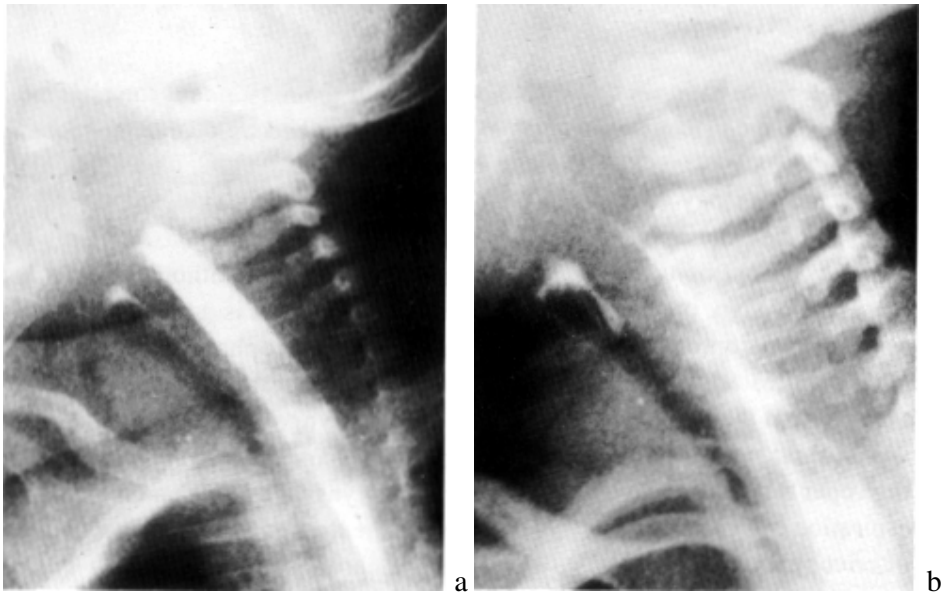


Fig. 5. a: Tracheal aspiration with prominent esophageal bar (arrow- the epiglottis); b) "Cross-roll" sign (without aspiration).



a b

Fig. 6. a-b: Tracheal aspiration of different severity (CPD).

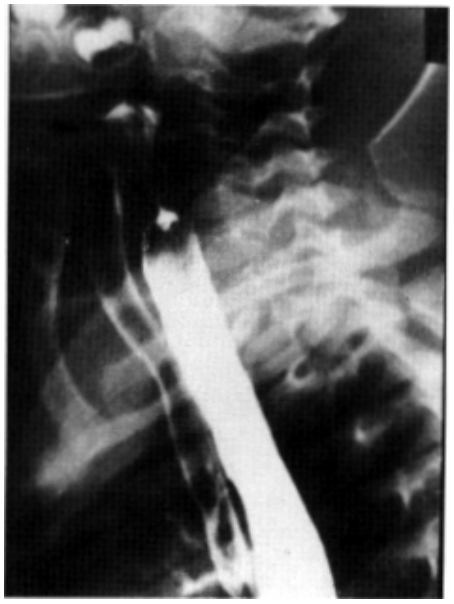


Fig. 7: Esophageal spasm with severe tracheal aspiration (CPA).

The relation between recurring obstructive bronchitis and CPD is likely even if GER is an associated finding in almost all cases. The frequent joint occurrence of the two disorders (CPD and GER) raise the possibility that in their background there are common pathogenetic causes such as innervation immaturity. It would be interesting to clarify whether CPD was present in cases where GER was held responsible for causing upper airway symptoms. Certainly the immaturity of innervation is suggested by the fact that most of the children "grow out" of this disorder and according to our observations and control examinations symptoms gradually abate.

So far the observed cases have not been so severe to indicate surgical therapy, balloon dilatation. GER was treated by means of position therapy, special diet and medications as required. Children are followed up and after 6-12 months have passed control contrast swallow is carried out [2].

Conclusion

Contrast swallows with water soluble contrast material remaind an important radiological examination to reveal possible causes of obstructive bronchitis in infants.

References

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