Sheffield Teaching Hospitals NHS
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Congenital familial subglottic stenosis and review of literature

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Introduction

Subglottic stenosis may be congenital (primary) or acquired (secondary). Congenital stenosis may be caused by either a small cricoid cartilage or a thick sub mucosa secondary to failure of canalization of the subglottic lumen and it may also be associated with other laryngeal anomalies. Acquired subglottic stenosis (ASGS) is caused by soft-tissue stenosis due to trauma following prolonged endotracheal intubation. Congenital subglottic stenosis (CSGS) is a well known cause of strider in infancy. It usually occurs sporadically and familial occurrence is rare.

Materials and methods

Main body text 6pt approx arial Three children who presented with subglottic stenosis born to consanguineous parents were identified. For the literature research, reports published from 1950 to June 2011 were retrieved. We also screened bibliographies of the collected articles to identify pertinent reports. They consisted mainly of single case reports and case series. A summary of evidence from the literature is discussed.

Results

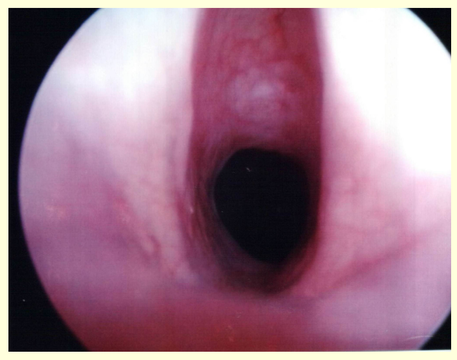
Three Asian children were born with congenital subglottic stenosis for closely related consanguineous parents. Their presentation, family tree, genetic tests, associated features and treatment are discussed.

Case reports

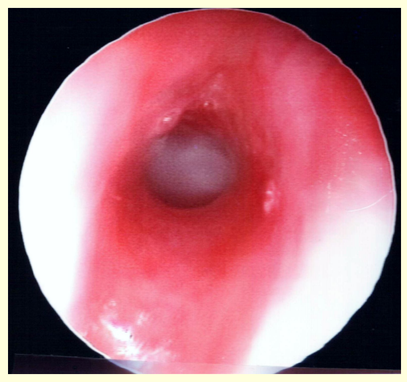
Case 1

A boy (11years, AHQ) was born at 33 weeks preterm by normal birth and his birth weight was 2.9 kg. He needed no resuscitation other than nasal continuous positive airway pressure and did not require ventilation/intubation. He was symptom free until the age of 2 when the anaesthetist noticed subglottic stenosis during intubation for religious circumcision. The procedure was abandoned and postoperatively he developed harsh inspiratory stridor and was referred to an otolaryngologist when a diagnosis of grade II subglottic stenosis was made. Intermittently he was having harsh inspiratory noise and mild recession without tracheal tug. Of relevance his medical history included failure to thrive and rickets. He did not have any dysmorphic features and developmentally was normal. All blood tests including full blood count, U&E, liver function test, ferritin, antibodies and immunoglobulins, amino organic acids, intestinal biopsy, and ultrasound head were normal. He had normal dietary assessment with appropriate intake but with poor weight gain. He continued to be small for age and failure to thrive did not improve .At age of 35 months he was diagnosed with complete growth hormone deficiency and has been prescribed growth hormone injections.

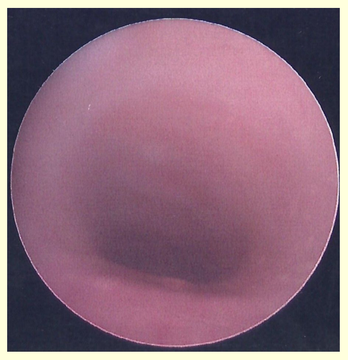
He was managed conservatively until four years of age when he developed noisy breathing during upper respiratory infections. He had adenotonsillectomy at age of 5 years for sleep disordered breathing. At the age of 6 yrs 4 month he was breathless on exertion and still had failure to thrive. Single stage anterior graft laryngotracheal reconstruction was carried out at the age of 7 years 4 months. Post operatively he developed granulation tissue around the graft. This was managed conservatively. The shortness of breath on exertion abated following surgery and he was discharged one year after surgery.



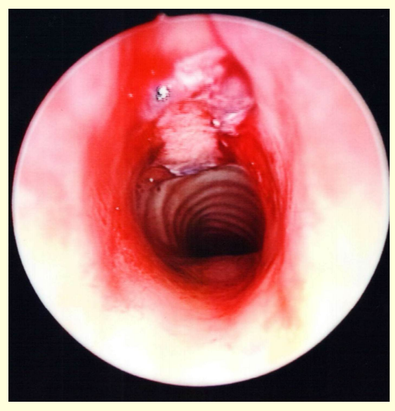
Case 1 figure 1 subglottis Grade 2 stenosis



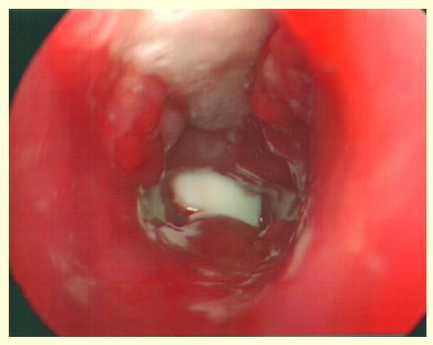
Case 2 Figure 1 subglottis Grade 3 stenosis



Case 3, Figure 1 subglottis Grade 3 stenosis



Case 1 figure 2, subglottis post LTR with anterior graft



Case 2 Figure 1 subglottis post LTR with anterior and posterior graft

Case 2

A boy (FH, 3years) was born at 38 weeks preterm by normal birth and his birth weight was 2.58 kg. Antenatal and post natal history was unremarkable and no history of previous intubation or special care unit admission. He had emergency tracheostomy for failed intubation during congenital inguinal hernia repair and at the age of 5 months subsequently he had bilateral inguinal hernia repair and religious circumcision. He suffered with renal impairment and hypertension due to dysplastic kidneys. He also suffered with poor weight gain. He was of proportionate small stature and his growth was along 0.4th centile He was diagnosed with grade III subglottic stenosis. He was managed with repeated balloon dilation. He had laryngotracheal reconstruction with anterior and posterior rib graft at 33 months. He is currently symptom free without tracheostomy.

Case 3

A boy (ZM, 1 year) born at 38 weeks by Caesarean section for poor fetal growth and maternal diabetes. From birth he had noisy breathing while feeding and was admitted at 3 months of age with upper respiratory infection and worsening of biphasic strider. He was diagnosed with grade III subglottic stenosis and had tracheostomy. He had bilateral inguinal hernia and also facial features of broad based nose, upturned nose, and short philtrum. He was referred to genetics department. His Karyotype was normal male 46 xy, Fish 22q11.2 test showed normal result.

Family tree

Discussion

O Linna et al reported congenital subglottic stenosis in two unrelated pairs of siblings1. Our three patients were born for consanguine parents. All our patients are male and all suffered with growth retardation. First patient had grade 2 subglottic stenosis and other two patients had grade 2 subglottic stenosis. In our case series the age of presentation ranged between 5 weeks and 2 years. Basic genetic tests carried out for case 2 and 3. Genetic results are awaited for case 1.

There is suggested the existence of a genetic factor or factors which may predispose certain infants to the development of ASGS. The expression of such genetic influence may be expressed through the a priori presence of CSGS or other genetically based mechanisms including abnormal cartilage growth or development, specific patterns of chondral or mucosal injury, the action of specific growth factors, or the effects of autoimmune or inflammatory mediators. Pizzuto M et al, propose that genetic predisposition be considered a possible risk factor in the development of subglottic stenosis2. Buchsteiner I et al reported Congenital subglottic laryngeal stenosis in 2 brothers with chondrodysplasia syndrome (Keutel-Gabriel syndrome)3

Conclusions

Congenital familial subglottic stenosis in unrelated parents has been reported previously but not in consanguineous parents. The genetic work up of these families is still incomplete although the family history suggests a genetic aetiology. Further genetic research is needed to assess the mode of possible heritage in these cases.

Acknowledgement

Mr Bull –Involved in the management of case 1

References

1. O Linna, K Hyrynkangas, T Kaukola, L Pajunen Congenital subglottic stenosis in two unrelated pairs of siblings.Acta Paediatr 92:565-567. 2004

2. Pizzuto M, Donaldson D, Brodsky L .A role for genetic predisposition in subglottic stenosis. Int J Pediatr Otorhinolaryngol. 1998 Aug 1;44(3):279-84

3. Buchsteiner I, Kempf HG, Arslan-Kirchner M, Schulze-Florey T. Congenital subglottic laryngeal stenosis in 2 brothers with chondrodysplasia syndrome (Keutel-Gabriel syndrome).Laryngorhinootologie. 1998 Jul;77(7):363-6