CASE REPORT

Childhood acne in a boy with XYY syndrome

Christos Kasparis,[1] Annette Loffeld[2]

[1]Department of Dermatology, South Warwickshire Foundation Trust, Warwick, West Midlands, UK
[2]Department of Dermatology, Solihull Hospital, Solihull, UK

Correspondence to
Dr Christos Kasparis,
christos_kasp@yahoo.co.uk

SUMMARY

A 3-year-old boy was referred to the dermatology department with a 12-month history of facial erythema associated with a papular-pustular facial eruption consistent with childhood acne. He had been diagnosed with XYY syndrome identified during genetic analysis for cardiac anomalies at birth. XYY syndrome is an aneuploidy of the sex chromosomes which affects 1 in 1000 male births. It is often asymptomatic and identified incidentally following genetic analysis for other conditions. The syndrome can be associated with an increased risk of learning difficulties and delayed language skills. Early diagnosis could alert physicians to the possibility of subtle developmental and learning abnormalities and result in prompt management. Our case highlights the fact that the presence of childhood acne could aid in the early detection of XYY syndrome.

BACKGROUND

XYY syndrome is an aneuploidy of the sex chromosomes which affects 1 in 1000 male births. It is often asymptomatic and identified incidentally following genetic analysis for other conditions. Affected boys have an increased growth velocity during early childhood and higher average final height. Some of the early reports on XYY syndrome come from studies performed in male prisoners showing an increased incidence of this chromosomal anomaly in this group compared to the general population.[1] These findings pointed towards a link between the XYY karyotype and criminal behaviour, although arguably selection bias was present in those studies that concentrated on relatively small numbers of institutionalised males. Other features that characterise the syndrome are learning difficulties and delayed language skills. Severe nodulocystic and scarring acne has also been described in association with XYY syndrome in teenagers and young adults.[2] However, as far as we are aware, childhood acne has never been reported in XYY syndrome. We present the case of a 3-year-old boy who was found to have XYY syndrome and developed mild acne.

CASE PRESENTATION

Our patient was diagnosed with a congenital hypoplastic aortic arch with a large ventricular septal defect which required surgical repair and pacemaker insertion soon after birth. A chromosomal analysis was carried out looking specifically for chromosome 22q deletion to investigate whether his cardiac features were manifestations of the 22q11.2 deletion syndrome. This was normal but an extra Y chromosome was discovered. At the age of 2 he was found to have delayed speech and language skills and was diagnosed with autism. He used sign language to communicate with his parents until he started to speak at the age of 3. He subsequently developed global developmental delay and received intensive speech and language therapy. He was referred at the age of 3 to the dermatology department with a 12-month history of facial erythema associated with a papular-pustular eruption of the face. Clinically he had scattered acneiform papules and pustules affecting mainly the mid and lower face consistent with acne vulgaris. The appearances were those of mild acne as there were no large inflamed nodules, deep cysts or scarring and overall the number of lesions was low (figures 1 and 2). His acne was predominantly inflammatory with no clinically visible comedones. Importantly, he had no evidence of secondary sexual characteristics to suggest abnormal virilisation or features of precocious puberty. He was in the 75th centile for weight and 90th centile for height.

INVESTIGATIONS

A hormonal profile including testosterone, luteinising hormone (LH), follicle-stimulating hormone (FSH), 17-hydroxyprogesterone (17-OHP), dehydroepiandrosterone (DHEAS), random cortisol and prolactin to look for secondary causes of acne was performed. The results were unremarkable. Previously reported data suggest that normal levels of testosterone, LH and FSH are usually found in XYY syndrome.[3] No other tests to confirm the diagnosis were required.

DIFFERENTIAL DIAGNOSIS

Childhood acne needs to be differentiated from other skin conditions such as childhood rosacea, keratosis pilaris, miliaria and acneiform drug eruptions. In our patient, papules and pustules were distributed away from the convex surfaces of the central face and the skin lacked any telangiectasia, features that favoured acne vulgaris over rosacea. In

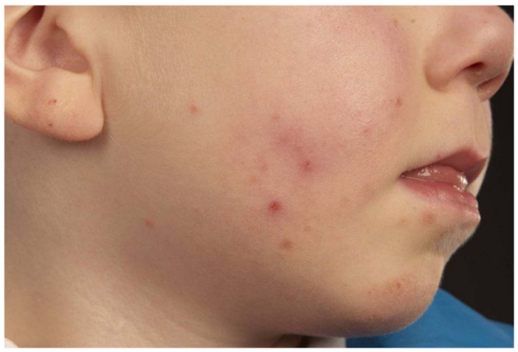

Figure 1 Facial papules and pustules.

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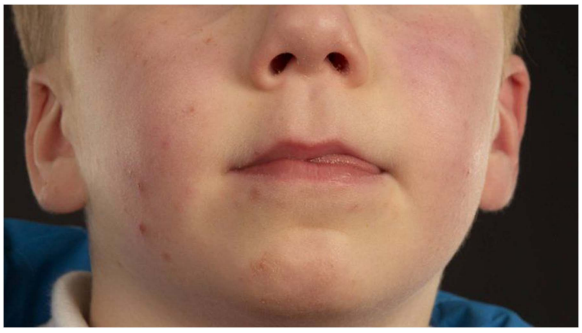

Figure 2 Acne involving the outer cheeks and chin.

addition, ocular involvement was absent and although no clinically apparent comedones were seen, it is possible that microcomedones were present. The presence of pustules rather than follicular keratotic papules would suggest it was not keratosis pilaris. The latter does not respond to topical or oral antibiotics. The long duration and lack of association with a warm environment did not favour miliaria. There was no history of drug exposure prior to the eruption starting.

TREATMENT

Topical erythromycin therapy for acne was initiated with only partial response. The patient was therefore commenced on oral erythromycin to which he had a good response; however, clearance was not permanent and further courses of oral erythromycin were required. Currently, his acne is well controlled by the intermittent use of topical azelaic acid when necessary.

OUTCOME AND FOLLOW-UP

At the moment the patient has an open appointment with the dermatology department in case of a flare-up not controlled by the topical therapy.

DISCUSSION

Childhood acne can present from 1 to 7 years of age and is very rare.[4] This is in contrast to commoner types of acne such as neonatal acne, which can affect up to 20% of newborns, and infantile acne, which usually presents between 3 and 6 months of age. Childhood acne can present with facial comedones, papules and pustules and, more rarely, deeper nodules with scarring.

During the first year of life, the presence of acne is thought to be related to androgen production from the fetal adrenal gland.[5] This in turn stimulates sebaceous glands in the skin responsible for the production of sebum. *Malassezia* species, which are common skin colonising yeasts, may also play a role in the pathophysiology of acne in this age group. Adrenal androgen secretion diminishes after the first 12 months of life and returns around the age of 7 with the re-appearance of the zona reticularis where androgen production takes place, leading to the development of adrenarche. Testicular testosterone production is also non-existent or minimal before the age of 7. It is therefore important to exclude secondary endocrine causes of acne such as hyperandrogenism, Cushing's syndrome or precocious puberty in children presenting with acne between 1 and 7 years of age, especially if other secondary sexual characteristics are present. Karyotype analysis, however, has not been part of the routine evaluation of children with childhood acne.

Several reports have commented on the increased frequency of moderate to severe and nodulocystic acne in mostly teenagers and young adults with the XYY complement. In 1971, Voorhees *et al* reported a 4% incidence of the XYY genotype among 100 male prisoners with nodulocystic acne compared with no incidence of this genotype in prisoners without nodulocystic acne.[6] The authors also identified the XYY genotype in 2% of a study group of 100 male outpatients with nodulocystic acne, a rate 11 times higher than the rate of XYY in the general male neonatal population. In contrast, the XXY karyotype of Klinefelter syndrome is believed to exclude severe acne. Based upon these findings, the authors suggested a possible link between the presence of an extra Y chromosome and the development of acne.

To our knowledge, there is no reported evidence in the literature of children presenting with acne investigated or found to have an extra Y chromosome. Our case highlights the possibility of an association between childhood acne and XYY syndrome. The development of acne alongside increased height in a child could provide early signs that the XYY karyotype might be responsible. Early diagnosis with karyotype analysis could alert physicians to the possibility of subtle developmental and learning abnormalities and result in prompt management. Parents and physicians need to be aware of the potential link between childhood acne and XYY syndrome which also predisposes to severe adolescent nodulocystic acne.

Learning points

- XYY syndrome is an aneuploidy of the sex chromosomes which affects 1 in 1000 male births associated with learning difficulties.
- Childhood acne can present from 1 to 7 years of age and is very rare.
- Secondary endocrine causes of acne such as hyperandrogenism, Cushing's syndrome or precocious puberty in children with acne aged between 1 and 7 years of age need to be excluded.
- Acne together with increased height in a child could indicate the presence of the XYY karyotype.
- Early diagnosis of the syndrome could alert physicians to the possibility of subtle developmental and learning abnormalities and result in prompt management.

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Competing interests None.

Patient consent Obtained.

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