Syndrome of the month

Aarskog syndrome

Mary E M Porteous, David R Goudie

Aarskog syndrome (facio-digital-genital syndrome) was first described in 1970 by Dagfin Aarskog who presented seven males from one family with a growth disorder and associated anomalies. A year later Scott reported three brothers with similar features and since then there have been over 100 cases published. We are aware of 12 subjects with Aarskog syndrome living in the west of Scotland (population 1.6 million). However, owing to the benign nature of the condition, it is underdiagnosed and the true incidence must be higher than this.

Inheritance

Aarskog syndrome has been assigned to the X chromosome on the basis of pedigree analysis but this interpretation remains open to doubt. The importance of shawl scrotum as a clinical feature produces a diagnostic bias in favour of males. The facial features are often as obvious in female carriers as in male carriers, and in two large pedigrees male to male transmission has been found.

In 1984, Bowle et al described a mother and son with Aarskog syndrome and an X;autosomal translocation (Xq13;8p21.2). In the absence of linkage data to clarify the issue, the disorder is as likely to be a partially sex limited autosomal dominant localised by the autosomal element of the translocation.

Clinical features

The table summarises the main clinical features found in Aarskog syndrome and compares the 17 males in the Glasgow series with those published previously.

Female carriers of the Aarskog gene often exhibit some of the features of the syndrome. They are usually short; all 13 women in our series were below the 10th centile for height, and many exhibit hand or facial anomalies making clinical diagnosis of carrier status possible.

**Clinical features in Aarskog syndrome.**

<table>
<thead>
<tr>
<th>Clinical features</th>
<th>Glasgow series</th>
<th>Published cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertelorism</td>
<td>16/17</td>
<td>73/83</td>
</tr>
<tr>
<td>Ptosis</td>
<td>8/17</td>
<td>33/64</td>
</tr>
<tr>
<td>Downward slanting palpebral fissures</td>
<td>10/17</td>
<td>33/64</td>
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<tr>
<td>Short nose</td>
<td>12/17</td>
<td>30/45</td>
</tr>
<tr>
<td>Wide philtrum</td>
<td>12/17</td>
<td>76/87</td>
</tr>
<tr>
<td>Maxillary hypoplasia</td>
<td>12/17</td>
<td>72/87</td>
</tr>
<tr>
<td>Anteverted nares</td>
<td>14/17</td>
<td>28/36</td>
</tr>
<tr>
<td>Abnormal auricles</td>
<td>9/17</td>
<td>76/86</td>
</tr>
<tr>
<td>Broad nasal bridge</td>
<td>17/17</td>
<td>33/58</td>
</tr>
<tr>
<td>Crease below lower lip</td>
<td>8/17</td>
<td>72/82</td>
</tr>
<tr>
<td>Widow's peak</td>
<td>8/17</td>
<td>44/51</td>
</tr>
<tr>
<td>Short/broad hands</td>
<td>14/17</td>
<td>49/60</td>
</tr>
<tr>
<td>Brachydactyly</td>
<td>13/17</td>
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</tr>
<tr>
<td>Syndactyly</td>
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<td>Clinodactyly</td>
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</tr>
<tr>
<td>Short 5th finger</td>
<td>15/17</td>
<td>22/28</td>
</tr>
<tr>
<td>Joint laxity</td>
<td>10/17</td>
<td>36/47</td>
</tr>
<tr>
<td>Single palmar crease</td>
<td>13/17</td>
<td>25/38</td>
</tr>
<tr>
<td>Broad, short, bulbous toes</td>
<td>12/17</td>
<td>21/28</td>
</tr>
<tr>
<td>Short stature (3rd centile)</td>
<td>15/17</td>
<td>71/81</td>
</tr>
<tr>
<td>Shawl scrotum</td>
<td>9/17</td>
<td>65/79</td>
</tr>
<tr>
<td>Cryptorchidism</td>
<td>6/17</td>
<td>54/77</td>
</tr>
<tr>
<td>Inginal herniae</td>
<td>11/17</td>
<td>47/77</td>
</tr>
<tr>
<td>Prominent umbilicus</td>
<td>10/17</td>
<td>6/7</td>
</tr>
<tr>
<td>Pectus excavatum</td>
<td>3/17</td>
<td>31/57</td>
</tr>
</tbody>
</table>

**FACIES**

Boys with Aarskog syndrome are strikingly similar in facial appearance. Fig 1 shows two unrelated boys with Aarskog syndrome and fig 2 shows three brothers with the syndrome. Carrier females may exhibit many of the facial features (fig 3).

The cardinal features are hypertelorism, a widow’s...
Aarskog syndrome

Figure 1  Two unrelated boys with Aarskog syndrome.

Figure 2  Three brothers with Aarskog syndrome.

Figure 3  Female obligate gene carrier.

peak, ptosis, downward slanting palpebral fissures, small, short nose with anteverted nares, a broad nasal bridge, maxillary hypoplasia, abnormal auricles, a wide philtrum, and a crease below the lower lip. Fig 4 shows the evolution of the facial phenotype through time.

SKELETAL

Short stature in Aarskog syndrome is disproportionate, with an increased upper to lower segment ratio. The hands are short and broad with brachydactyly, syndactyly, clinodactyly, particularly short fifth fingers with single creases, single palmar creases, and striking joint laxity particularly evident in the phalanges (fig 5).

Other skeletal abnormalities which have been documented are odontoid hypoplasia with cervical
ligamentous laxity, scoliosis, metatarsus adductus, and splayed toes with bulbous tips.

GENITAL
The characteristic abnormality in Aarskog syndrome is the shawl or overriding scrotum, though this need not be a constant feature. It becomes much less obvious with age. Cryptorchidism is common as are inguinal herniae. If the cryptorchidism is corrected early, fertility is unimpaired.

GROWTH
The majority of males with Aarskog syndrome are short, usually below the 10th centile and often below the 3rd. Infants have a normal birth weight but growth falls away across the centiles over the first year. Children remain very small until they enter puberty. Puberty is often delayed but inevitably occurs bringing with it a prolonged growth spurt.

INTELLIGENCE
Subjects with Aarskog syndrome can be expected to have normal intelligence when allowance is made for the ascertainment bias associated with recognition and reporting of handicap in dysmorphic syndromes, and the fact that a number of reported cases with mental

Figure 4 Man with Aarskog syndrome pictured in infancy, childhood, and as an adult.

Figure 5 The hands in Aarskog syndrome.
Aarskog syndrome
d
handicap do not satisfy the diagnostic dysmorphic
criteria. The proportion of mentally handicapped
persons does not show a statistically significant excess
over that in the general population, although the
sample size is too small to exclude positively an
association with mild learning difficulties.

VISION
There is an increased incidence of hypermetropia in
persons carrying the gene for Aarskog syndrome.

LIFE EXPECTANCY
Aarskog syndrome is associated with a normal life
span.

Differential diagnosis
The differential diagnosis of Aarskog syndrome
includes Noonan syndrome and Robinow syndrome.
Aarskog syndrome is not associated with heart defects
or major genital abnormalities and caution should be
exercised before making a diagnosis of Aarskog
syndrome if they are present.

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