layer of the epidermis is hyperpigmented, although there is no increase in the number of melanocytes. Melanophages are present in the dermis and there is an increase in the number of arrector pili muscles, making differentiation from smooth muscle hamartoma sometimes impossible. 3,4

Becker nevus is androgen dependent and, in consequence, although it is congenital, it is not uncommon for it to become more pronounced during adolescence, particularly in males. 4-6 It is occasionally associated with other abnormalities, such as hypoplasia of the ipsilateral breast and the presence of muscle, skeletal, or cutaneous abnormalities. The presence of any of these abnormalities associated with Becker nevus defines a characteristic phenotype called Becker nevus syndrome. 4,7 These abnormalities usually but not invariably appear on the same side of the body. 3,7

We present 4 patients with Becker nevus and associated abnormalities within the spectrum of what is usually found in Becker nevus syndrome.
Case Descriptions

Case 1

A 13-year-old boy presented a lesion that appeared spontaneously at 3 years of age; the lesion was situated over the right scapular region and extended onto the right shoulder and arm. It had a hairy surface and was associated with hypoplasia of the ipsilateral breast. The patient also presented clinical and radiological signs of scoliosis (Figure 1).

Case 2

A 12-year-old boy presented a brown lesion on the anterior aspect of the chest that had been present since 6 months of age. The lesion had a hairy surface and biopsy confirmed the diagnosis of Becker nevus. Ipsilateral breast hypoplasia was detected on examination (Figure 2). Clinical and radiological examination did not reveal scoliosis. The patient also had 3 café-au-lait spots on the back.

Case 3

The patient was a 12-year-old boy with a past medical history of hydronephrosis secondary to bilateral ureteral stenosis who consulted for an asymptomatic brown patch situated on the right side of the chest that had appeared spontaneously over the previous 2 or 3 years. Biopsy was compatible with a diagnosis of Becker nevus. Examination revealed thinning of the right pectoralis muscle over which the nevus was situated. The patient did not present scoliosis or other skeletal abnormalities.

Case 4

The patient was a 12-year-old boy who consulted for an asymptomatic brown patch on the right side of the chest that had appeared when he was 8 years of age. On examination, a nonhairy brown patch with irregular borders was observed. The pectoralis muscle over which the lesion was situated was thinner than the contralateral muscle. The patient had clinical signs of moderate scoliosis.

The findings of these cases are summarized in Table 1.

Table 1. Case Descriptions

<table>
<thead>
<tr>
<th>Case</th>
<th>Sex</th>
<th>Age at Appearance</th>
<th>Localization</th>
<th>Hypertrichosis</th>
<th>Ipsilateral Breast Hypoplasia</th>
<th>Other Findings</th>
<th>Family History</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>3 years</td>
<td>Scapular, shoulder, right arm</td>
<td>Yes</td>
<td>Yes</td>
<td>Scoliosis</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>6 months</td>
<td>Left hemithorax</td>
<td>Yes</td>
<td>Yes</td>
<td>Café-au-lait spots</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>9-10 years</td>
<td>Right hemithorax</td>
<td>No</td>
<td>Yes</td>
<td>Bilateral ureteral stenosis</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>8 years</td>
<td>Right hemithorax</td>
<td>No</td>
<td>Yes</td>
<td>Scoliosis</td>
<td>No</td>
</tr>
</tbody>
</table>
Table 2. Clinical Spectrum of Becker Nevus Syndrome

<table>
<thead>
<tr>
<th>Becker nevus</th>
<th>Ipsilateral breast hypoplasia</th>
<th>Ipsilateral hypoplasia of the shoulder</th>
<th>Ipsilateral hypoplasia of the arm</th>
<th>Vertebral defects/scoliosis/spina bifida occulta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other musculoskeletal defects:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cervical rib/fused ribs</td>
<td>Pectus excavatum</td>
<td>Pectus carinatum</td>
<td>Bilateral tibial torsion</td>
<td>Scapular asymmetry</td>
</tr>
<tr>
<td>Hypoplasia of the sternocleidomastoid muscle</td>
<td>Ipsilateral dental hypoplasia and facial asymmetry</td>
<td>Umbilical hernia</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other skin defects:  
- Hypoplasia of extramammary subcutaneous tissue  
- Hypoplasia of the contralateral labium minus  
- Accessory scrotum  
- Sparse hair in the ipsilateral axilla  
- Skin hypoplasia over the temporal bone  
- Supernumerary nipples

Discussion

The majority of publications prior to the definitive description of Becker nevus syndrome reported the association of Becker nevus with scoliosis or unilateral breast hypoplasia. Subsequently, other associated abnormalities were added to the clinical spectrum of what became known as Becker nevus syndrome (Table 2). Although scoliosis falls within this clinical spectrum, it is not sufficient in itself to establish the definitive diagnosis. Becker nevus syndrome is included within the group of epidermal nevus syndromes, together with nevus sebaceous syndrome, nevus comedonicus syndrome, phakomatosis pigmentokeratotica, Proteus syndrome, and CHILD (congenital hemidysplasia with ichthyosiform erythroderma and limb defects) syndrome. Epidermal nevi are hamartomatous lesions derived from epidermal components; they arise from mutations in pluripotent cells during the early stages of embryogenesis.

Although the majority of published cases of Becker nevus syndrome are sporadic, familial grouping can be observed very rarely, probably due to a paradoxic inheritance phenomenon. The genetic basis of Becker nevus syndrome has not been established, but it is assumed to be due to a postzygotic autosomal lethal mutation that survives in mosaic form; in fact, Becker nevus usually presents a pattern of mosaicism, either as a patch with serrated borders or, less frequently, as a segmental or “flag-like” lesion. The association of Becker nevus with the other abnormalities is probably due to mutations occurring earlier than those responsible for isolated Becker nevus.

Becker nevus syndrome affects males and females in equal proportions, whereas it has been reported that the male to female ratio in Becker nevus is 2 to 1; this could be related to the dependence of the lesion on androgens. The discrepancy might also be explained by the more clinically pronounced breast hypoplasia in females than in males. Our 4 cases were sporadic and all of them occurred in males. No further abnormalities other than those described were subsequently detected in any of the 4 cases after a follow-up of between 1 and 12 years. Finally, given that the appearance of Becker nevus-associated abnormalities in this syndrome can be relatively subtle, it is likely that many cases have passed undetected, and that the syndrome is more common than may be thought from the limited number of cases published.

Conflicts of Interest

The authors declare no conflicts of interest.

References