A CLINICOEPIDEMIOLOGICAL STUDY OF PEDIATRIC MELANOMA IN ALBERTA, CANADA FROM 1992-2011

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Introduction

• Pediatric melanoma patients make up only about 1-2% of all melanoma patients; less than 1% of melanoma occurs in prepubescent children.

• The exact clinicoepidemiological characteristics of pediatric melanoma continue to be debated in the literature.

• While some authors report continued increases in melanoma incidence in all age groups, others have found that rates have begun to stabilize and possibly decrease.

• Melanoma in pediatric patients often displays clinical characteristics distinct from adult melanoma, including amelanosis and color uniformity. Further, its histopathological differentiation from atypical Spitz nevi can be problematic.

• While prepubescent children tend to present with thicker tumors and a higher rate of nodal metastasis, overall survival is actually higher in younger children.

Methods

• We completed a population-based, retrospective analysis of all incident cases of melanoma diagnosed in patients ≤ 20 years old in Alberta, Canada from 1992 to 2011.

• Data was obtained from the Alberta Cancer Registry (ACR), a population-based provincial cancer registry.

• All statistical analyses were performed by an experienced, senior biostatistician.
Patient Demographics

- A total of 71 cases of invasive melanoma and 28 cases of melanoma in situ were diagnosed between 1992-2011.
- 63% were female, 37% were male.
- Mean age = 17.5 years
- 76% of patients lived in an urban center; 24% in a rural community.

General Incidence Trends

Fig. 1: Number of new cases of pediatric melanoma in Alberta, Canada over time.

Average overall age-standardized yearly incidence = 3.9 per million
(95% CI: 3.0, 4.8)

Topography

Fig. 2: Anatomical distribution of pediatric melanoma in Alberta, Canada from 1992-2011.

* No significant difference in anatomical distribution was seen between the sexes.
Age-Specific Findings

- The overall mean age was 17.5 years.
- Melanoma diagnosed before the age of 14 is extremely rare.
- The youngest patient to be diagnosed with invasive melanoma was 12 y.o., while the youngest patient to be diagnosed with melanoma in situ was only 3 y.o.

Fig. 3: Age distribution of pediatric melanoma cases in Alberta, Canada between 1992-2011

Age-Specific Findings

The changes seen in age-specific incidence over the duration of our study showed a trend towards significance (p=0.09) such that incidence in the 15-16 year and 19-20 year age groups decreased and incidence in the 17-18 year age group increased.

Fig. 4: Trends in age-specific incidence of pediatric melanoma from 1992-2011 in Alberta, Canada

Tumor Characteristics

- Overall, tumors most commonly had a Breslow thickness between 0.50-1.00mm (37.3%).
- While only 2 of the first 37 diagnosed cases (5.4%) had a Breslow thickness >1.50mm, 10 of the next 34 cases (29.4%) had a thickness >1.50mm, representing a significant shift in the distribution of Breslow thickness over time.

Fig. 5: Breslow thickness of pediatric melanoma diagnosed in Alberta, Canada between 1992-2011
Tumor Characteristics

Three out of four cases were found to have a Clark’s level of II or III, while only 3% of cases extended into the subcutaneous tissue (Clark’s level V).

Table 1: Histological subtypes of pediatric melanoma diagnosed in Alberta, Canada between 1992-2011.

<table>
<thead>
<tr>
<th>Histological Subtype</th>
<th># of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial spreading melanoma</td>
<td>38</td>
</tr>
<tr>
<td>Nodular melanoma</td>
<td>4</td>
</tr>
<tr>
<td>&quot;Epithelioid cell&quot; melanoma</td>
<td>1</td>
</tr>
<tr>
<td>Melanoma in situ</td>
<td>28</td>
</tr>
<tr>
<td>Melanoma, NOS</td>
<td>28</td>
</tr>
</tbody>
</table>

Mortality Data

- 50% of nodular melanomas diagnosed during our study period resulted in death
- Average time to death was 38 months
- Average Breslow thickness for cases resulting in mortality was 2.2mm, with 6 of 7 cases in which B.T. was reported having a thickness >1.0mm

Table 2: Characteristics of 8 fatal cases of pediatric melanoma diagnosed in Alberta, Canada between 1992-2011

<table>
<thead>
<tr>
<th>Patient (Age,Sex)</th>
<th>Anatomical Site</th>
<th>Histological Subtype</th>
<th>Breslow Thickness</th>
<th>Time to Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>19F Trunk S.S</td>
<td>1.7mm</td>
<td>40 mo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20M Trunk S.S</td>
<td>0.7mm</td>
<td>23 mo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18M Lower limb S.S</td>
<td>1.6mm</td>
<td>35 mo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16F Scalp NOS</td>
<td>1.1mm</td>
<td>59 mo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18M Ear NOS</td>
<td>N/A</td>
<td>26 mo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14F Lower limb Nodular</td>
<td>3.4mm</td>
<td>83 mo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16F Trunk UNC</td>
<td>1.1mm</td>
<td>39 mo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17F Trunk Nodular</td>
<td>5.5mm</td>
<td>20 mo</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Patient (Age,Sex)

- S.S – superficial spreading melanoma; NOS – Not Otherwise Specified

Prognostic Factors

- Only Breslow thickness and (increased) age were found to be statistically significant prognostic indicators for mortality.
- The 5-year survival of children with melanoma >1.00mm thick was found to be only 55.6%.
Summary

- Melanoma in pediatric patients is rare, with an annual incidence of 3.9 per million children in Alberta, Canada during our study period.
- The incidence of invasive melanoma before the age of 14 is vanishingly small.
- Incidence of pediatric melanoma appears to have stabilized and may in fact be decreasing.
- The most commonly affected area is the trunk, followed by the lower extremities.
- The proportion of pediatric melanoma cases being diagnosed with a Breslow thickness >1.50mm has increased.
- Breslow thickness and increasing age are the two main prognostic factors for mortality from pediatric melanoma.
- The nodular variant appears to carry a higher risk of death than other subtypes.

References