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

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8th Canadian Melanoma Conference
Sunday, February 23rd, 2014

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

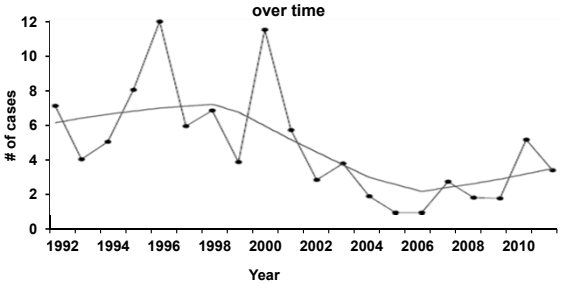
- We completed a population-based, retrospective analysis of all incident cases of melanoma diagnosed in patients ≤ 20 years old in Alberta, Canada from 1992 to 2011.
- Data was obtained from the Alberta Cancer Registry (ACR), a population-based provincial cancer registry.
- All statistical analyses 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

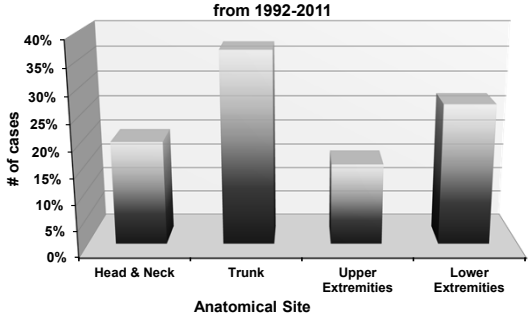
Fig. 1: Number of new cases of pediatric melanoma in Alberta, Canada over time



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

Topography

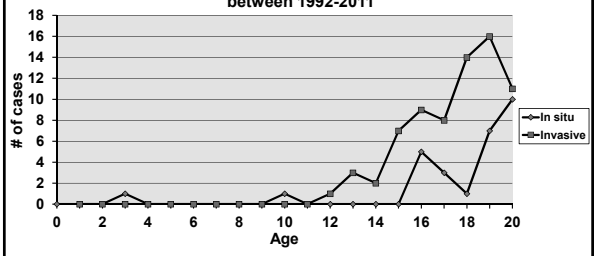
Fig. 2: Anatomical distribution of pediatric melanoma in Alberta, Canada from 1992-2011



- No significant difference in anatomical distribution was seen between the sexes.

Age-Specific Findings

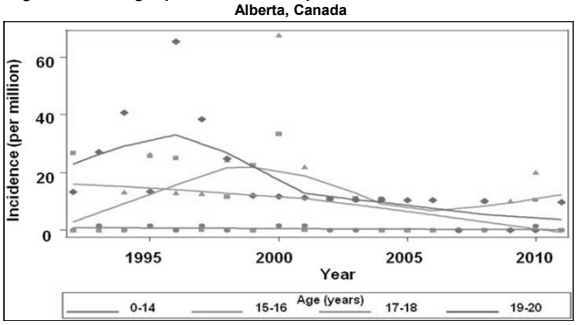
Fig. 3: Age distribution of pediatric melanoma cases in Alberta, Canada between 1992-2011



- 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!

Age-Specific Findings

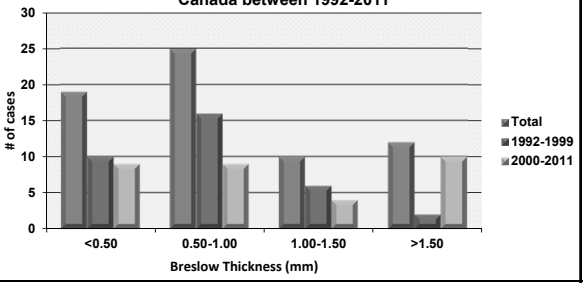
Fig. 4: Trends in age-specific incidence of pediatric melanoma from 1992-2011 in Alberta, Canada



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.

Tumor Characteristics

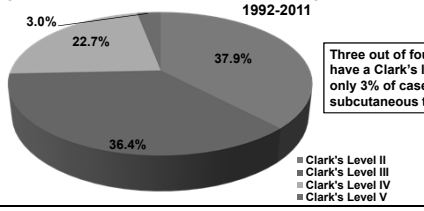
Fig. 5: Breslow thickness of pediatric melanoma diagnosed in Alberta, Canada between 1992-2011



- Overall, tumors most commonly had a Breslow thickness between 0.50-1.00mm (37.9%).
- 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.

Tumor Characteristics

Fig. 6: Clark's level of pediatric melanoma diagnosed in Alberta, Canada between 1992-2011



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.

Histological Subtype	# of cases
Superficial spreading melanoma	38
Nodular melanoma	4
"Epithelioid cell" melanoma	1
Melanoma in situ	28
Melanoma, NOS	28

Mortality Data

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

Patient (Age,Sex)	Anatomical Site	Histological Subtype	Breslow Thickness	Time to Death
19F	Trunk	S.S	1.7mm	40 mo
20M	Trunk	S.S	0.7mm	23 mo
18M	Lower limb	S.S	1.6mm	35 mo
16F	Scalp	NOS	1.1mm	59 mo
18M	Ear	NOS	N/A	26 mo
14F	Lower limb	Nodular	3.4mm	63 mo
18F	Trunk	UNC	1.1mm	39 mo
17F	Trunk	Nodular	5.5mm	20 mo

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

- **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**

Prognostic Factors

A)

Prognostic Variable	P-value
Breslow thickness	0.0075
Clark's level	0.0816
Age (independent of thickness)	0.0134
Sex	0.8623
Morphology	0.3172
Site	0.7681
Year of diagnosis	0.6858

B)

Breslow Thickness (mm)	5-year survival
<0.50	100%
0.50-1.00	94.4%
>1.00	55.6%
Overall	80.8%

- **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

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