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Immunity against tetanus and diphtheria after childhood sarcoma treatment

Immunität gegen Tetanus und Diphtherie nach Sarkombehandlung im Kindesalter

An important topic in cancer survivorship is loss of immunity to vaccine-preventable diseases (v. d. Hardt K et al., *Vaccine* 2000;18:2999-3004). Most studies have examined patients after hematological malignancies. Data on patients after treatment for solid tumours are rare.

The Late Effects Surveillance System (LESS) is a trinational multicentre study that prospectively registers sequelae of cancer therapy (Langer T et al., *Klin Padiatr* 2005;217:176-181).

Subject of this report are antibody levels (AL) against diphtheria (D) and tetanus (T), as surrogates for vaccine-preventable diseases, after sarcoma treatment in childhood. The measurements were carried out at the local hospitals conducting follow-up after end of treatment. Ten hospitals of the LESS-network contributed data. AL against D/T <0.1 IU/ml were not considered protective.

Forty-seven patients (31 male, 16 female) were included (10 osteo-, 12 for Ewing's, 25 soft tissue sarcomas). Median age at diagnosis was 9.6 (interquartile range (IQR): 4.4-14.7) years. A median of 7.2 (IQR 3.7-12.2) months after end of treatment the median D AL was 0.25 IU/ml and the median T AL was 0.7 IU/ml. In 13/47 (27.6%; 95% CI 16-43%) patients there were no protective AL (<0.1 IU/ml) against D and/or T. A further two patients had unclear D AL (<0.15 IU/ml); when classifying these values also as abnormal then 32% (15/47; 95% CI 19-47%) of patients would have had no protective AL. D and T AL were positively correlated ($r=0.39$; $p=0.007$). In multivariable analyses, the schedule of antineoplastic treatment, tumor type and time from end of treatment had no significant effect on AL. For D, girls had significantly lower AL (48% (95% CI 27-86%) than boys, $p=0.015$), and there was a tendency of younger patients having lower AL (5% (95% CI 0-10%) decrease per year younger, $p=0.058$). Younger patients also had significantly lower AL against T (9% (95% CI 2-17%)

decrease per year younger, $p=0.009$) whereas there was no statistical significant sex difference ($p=0.61$).

- Over 25% of examined patients were affected by lack of immunity, showing that also patients after sarcoma develop secondary immunodeficiency.
- Younger children are at increased risk, as previously described for other sequelae (Stöhr W et al., *Pediatr Blood Cancer* 2007;48:447-52).

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