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Oncological interventions in pediatric patients

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Objectives: While the use of interventional techniques to treat adult oncology patients is well established, the translation of these techniques to the pediatric realm continues to evolve. Interventional approaches provide a valuable alternative for disease treatment and symptom management. The pioneering use of interventional techniques to treat and palliate oncologic disease in pediatric patients is overdue. We evaluated pediatric patients who underwent different interventional procedures for cancer treatment or palliation at our institution.

Methods: We retrospectively reviewed the medical records and imaging studies of all pediatric patients with cancer who underwent interventional procedures e.g. cryoablation, radiofrequency ablation, sclerotherapy and transarterial embolization at our institution. Patient and disease demographics, interventional procedures performed and outcomes were documented. Symptomatic and radiological changes were evaluated and compared pre and post procedure.

Results: 198 pts (5-20 yrs.; mean age 12.5 yrs.) underwent interventional oncological procedures for different indications. The outcome of these interventions was individually evaluated at procedural level.

Conclusions: Interventional oncology in pediatric age group is an evolving specialty. Our experience demonstrates that these procedures are feasible and provide a safe and minimally invasive treatment and/ or palliative option in clinical care of children with cancer.

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A novel minimal invasive ablation of pediatric osteosarcoma with nanosecond pulsed electric field (ns-PEF) as a palliative therapy

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Our previous studies suggest that nanosecond pulsed electric field (ns-PEF) is a novel minimal invasive and non-thermal ablation method that can induce apoptosis in osteosarcoma MG-63 cells *in vitro*. The current study investigates the local and systemic antitumor efficacy of ns-PEF on osteosarcoma *in vivo* with micro metastasis. Osteosarcomas were treated by ns-PEF with puncture electrode at 40Kv/cm electric field strength of 500 pulses. The survival time, tumor volume, serum alkaline phosphatase, joint capsule and lung metastasis were followed up to 6 months post ns-PEF treatment. The efficacy was compared with no-treatment control and amputation surgery. Ns-PEF reduced tumor volume compared to the control group ($P<0.05$), it also inhibit serum alkaline phosphatase and lung metastasis, prolonged the survival time without joint deformity or capsule rupture. Ns-PEF cannot eradicate the tumor as amputation surgery ($P<0.05$), but the complication and hospitalization time were lower. Local ns-PEF ablation was found to be effective in achieving longer survival and less lung metastasis without chemotherapy, radiotherapy or biological therapy. As a non-thermal ablation method, ns-PEF has potential to treat osteo-sarcoma as a palliative therapy for osteo-sarcoma patients who constricted for surgery.

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