

AEPC-YIA Session

Fri. Jul 10, 2026 10:10 AM - 11:10 AM JST | Fri. Jul 10, 2026 1:10 AM - 2:10 AM UTC | Room4 (Room 601)

[AEPCYIA] AEPC-YIA Session (II-AEPCYIA)

Chair: Jan Janoušek (Children's Heart Centre, Motol and Homolka University Hospital, Prague, Czech Republic)

Chair: Mikiko Ishido (Department of Pediatric and Adult Cardiology, Tokyo Women's Medical University)

[II-AEPCYIA-6] Longitudinal Assessment of Cardiac Function After Craniospinal Irradiation in Pediatric Central Nervous System Tumor Survivors

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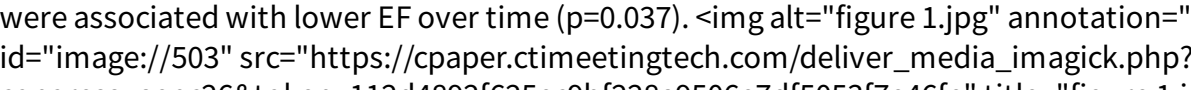
Background and Aim:

Survival among children with central nervous system (CNS) tumors has improved markedly. However, cardiovascular disease has emerged as an important cause of late morbidity in long-term survivors. Although anthracycline (AC) chemotherapy is not used to treat brain tumors, craniospinal irradiation (CSI) can expose the heart to radiation. The impact of CSI on heart function is poorly studied, and surveillance guidelines offer no CSI-specific recommendations. We aimed to evaluate longitudinal echocardiographic parameters of systolic and diastolic function following CSI and identify predictors of subsequent cardiac dysfunction.

Methods:

Retrospective multi-institutional cohort study (January 2000-September 2024) of pediatric CNS tumor patients treated with CSI without prior AC exposure. Serial echocardiographic assessment included left ventricular ejection fraction (EF), shortening fraction (SF), global longitudinal strain (GLS), and Doppler-based diastolic indices. Longitudinal changes were modelled using mixed-effects models adjusted for demographic, treatment, cardiovascular and endocrine variables.

Results:

Among 129 survivors (median age at diagnosis: 8 [IQR 5-11] years; median age at study: 23 [IQR 18-27] years), medulloblastoma was the most common diagnosis (80%) and most patients received photon-based CSI (median CSI dose: 2,360 [IQR 2,340-3,600] cGy; mean heart dose: 1.217 [IQR 2.340-3.600] cGy). Left ventricular EF and SF declined over time ($p=0.006$ and $p<0.00$, respectively), remaining stable through early adolescence, but decreasing at older ages (Figure 1A-B). GLS demonstrated a biphasic trajectory, with early post-CSI improvement followed by progressive decline ($p<0.001$), with sex-specific differences at younger ages ($p=0.015$) (Figure 1C). Diastolic parameters remained stable. Cardiovascular risk factors were present in 28%, dyslipidemia (39%; $n=14$) and overweight (22%, $n=8$) being the most frequent. Two-thirds of patients developed endocrine late effects, the most common being growth hormone deficiency ($n=58$, 67%). Endocrine comorbidities were associated with lower EF over time ($p=0.037$). 
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 Figure 1. Longitudinal trajectory of systolic echocardiographic parameters: A) EF; B) SF; C) GLS.

Conclusions:

We provide novel insights into cardiac vulnerability after CSI. Progressive long-term decline in systolic function was identified in CSI-treated CNS tumor patients, despite modest cardiac radiation doses and no prior AC exposure. Age at diagnosis, sex, and endocrine comorbidities modulate severity and evolution of systolic parameters, while diastolic indices remain stable.