

COST-EFFECTIVENESS OF THE CHILDREN'S ONCOLOGY GROUP (COG) LONG-TERM FOLLOW-UP (LTFU) GUIDELINES IN REDUCING THE RISK OF CONGESTIVE HEART FAILURE (CHF) IN LONG-TERM CHILDHOOD CANCER SURVIVORS (CCS)

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Background:

COG LTFU guidelines use echocardiographic (ECHO) screening for early detection of left ventricular dysfunction (LVD) in anthracycline-exposed CCS, recommending ECHOs at a frequency ranging from 1-5y depending on anthracycline dose, chest radiation therapy (RT), and age at diagnosis. The cost-effectiveness of these consensus-based guidelines is unknown.

Methods:

Life expectancy and age at CHF onset were projected in a simulated cohort of anthracycline-exposed CCS undergoing ECHO screening per COG LTFU guidelines stratified on age at diagnosis (1-4y; ≥5y), RT, and anthracycline dose. The hypothetical intervention for LVD (enalapril) was modeled to reduce annual CHF risk by 30%. Quality-adjusted life-years (QALYs) and lifetime costs with and without ECHO screening were calculated. Non-CHF mortality was estimated from the Childhood Cancer Survivor Study and US population rates. CHF incidence and mortality were derived from the extant literature. Costs (2010 US\$) and quality-of-life adjustments were obtained from the Healthcare Cost and Utilization Project and medical literature. Screening was considered cost-effective if it resulted in a >6 month delay in CHF onset and <\$50,000 per QALY gained.

Results:

Recommended screening strategies (Table) were cost-effective in: i) CCS exposed to ≥300mg/m² of anthracyclines regardless of RT or age at diagnosis; and ii) CCS diagnosed at age 1-4y, exposed to RT and <300mg/m² of anthracycline. Screening was most cost-effective for CCS diagnosed at age 1-4y exposed to RT and ≥300 mg/m² of anthracycline (1.4y delay in CHF onset; \$15,821 per QALY gained). Screening strategies were ineffective for other age/anthracycline-dose/RT combinations.

Conclusions:

Recommended ECHO screening strategies are cost-effective for CCS exposed to ≥300 mg/m² of anthracycline irrespective of age or RT; among 1-4y-olds, screenings are also cost-effective for CCS exposed to <300 mg/m² of anthracycline and RT. Alternate cost-effective screening strategies are needed for CCS with other exposure conditions.

COG screening guidelines				Cost-effectiveness results	
Age Dx	Chest RT	Anthracycline dose (mg/m ²)	Recommended ECHO interval (years)	Delay in CHF onset age (years)	Cost per QALY gained (2010 US\$)
1-4 years	Yes	Any	1	1.08	\$30,048
		<300	1	0.79	\$49,750
		≥300	1	1.44	\$15,821
	No	<100	5	0.35	\$17,798
		100 to < 300	2	0.36	\$29,415
		≥300	1	1.17	\$25,065
≥5 years	Yes	<300	2	0.38	\$36,874
		≥300	1	0.80	\$28,093
	No	< 200	5	0.13	\$50,750
		200 to <300	2	0.24	\$86,867
		≥300	1	0.72	\$36,401

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