Commentary

Scalp cooling and chemotherapy-induced alopecia: Evaluating cost-effectiveness and insurance coverage

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Abstract

Chemotherapy-induced alopecia (CIA) substantially affects patients' quality of life. Scalp cooling, or cold capping, reduces chemotherapy uptake in hair follicles and can help preserve hair, but insurance coverage remains inconsistent, limiting access. We conducted a cost-effectiveness analysis from a payer perspective comparing scalp cooling with 2 dermatologic management strategies for CIA. The incremental cost-effectiveness ratio (ICER) for scalp cooling was $3,050 per QALY versus dermatologic management plus minoxidil and –$2,950 per QALY versus dermatologic management plus minoxidil and platelet-rich plasma. Both ICERs fall below common United States willingness-to-pay thresholds, indicating that scalp cooling is cost-effective. These findings suggest that scalp cooling is a financially reasonable supportive care intervention and should be considered for routine insurance coverage.

Introduction

Chemotherapy-induced alopecia (CIA) is a common adverse effect of cancer treatment that substantially affects patients' quality of life and emotional well-being. Scalp cooling, or cold capping, can mitigate hair loss during chemotherapy. In the SCALP trial, 50.5% of women undergoing chemotherapy who used cold capping retained at least 50.0% of their hair compared with 0.0% in the control group.[1-3] Additionally, scalp cooling was associated with better outcomes in several quality-of-life measures, including a lower proportion of patients reporting decreased physical attractiveness after treatment (27.3% versus 56.3%).[3]

Scalp cooling preserves hair by reducing scalp temperature, leading to vasoconstriction and decreased delivery of chemotherapy to hair follicles. Although theoretical concerns have been raised about untreated occult scalp metastases, available evidence does not support an increased risk. Cutaneous metastases from breast cancer occur in fewer than 1.0% of cases,[4,5] and pooled analyses show no significant difference in scalp metastasis rates between patients who used scalp cooling and those who did not (0.61% versus 0.41%; $P = .43$).[6]

Despite its demonstrated benefits, insurance coverage of cold capping remains inconsistent (Table 1). In a survey of oncology providers, only 26.0% routinely initiated discussions about scalp cooling, with 58.0% citing financial barriers as the reason for not recommending it.[7] Cost concerns affect both patients and clinicians, yet objective data on socioeconomic barriers to scalp cooling are limited. Nonprofit organizations, such as HairToStay, have emerged to provide financial assistance, helping more than 1100 individuals in 2023; notably, 99.9% of applicants reported that the subsidy was a key factor in choosing scalp cooling.[8] Although some states have mandated insurance coverage for scalp cooling as part of oncology care,[9] others allow insurers to determine coverage independently, resulting in substantial variation in access.

Discussion

We conducted a cost-effectiveness analysis from the payer perspective to evaluate whether scalp cooling is a financially reasonable strategy to prevent CIA. Scalp cooling was compared with 2 alternative management approaches: (1) dermatologic management plus 1-year minoxidil, and (2) dermatologic management plus 1-year minoxidil and 3 sessions of platelet-rich plasma (PRP) therapy, over a 1-year time horizon. Costs were esti-

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Table 1. *Cold Capping Insurance Company Coverage.*

Insurance Company	Coverage Status	Key Notes
Aetna	Not covered	Not covered; scalp cooling devices considered incidental to chemotherapy and not separately reimbursed; patient purchased supplies are excluded.
Blue Cross Blue Shield	Covered (with conditions)	Covered for solid tumors in infusion suites using DigniCap® or Paxman®; not covered for pediatric patients, hematologic or skin cancers (eg, melanoma), or CNS involvement.
Medicare	Covered (with conditions)	Covers FDA-approved devices for solid tumors; excludes pediatric patients, melanoma, hematologic or CNS malignancies, and patients with cold sensitivity or scalp metastases.
UnitedHealthcare	Covered (under CPT codes)	Paxman system covered with CPT codes 0662T and 0663T; $50 co-pay per treatment.
Cigna	Not covered	Considered a convenience item; not reimbursed.
Humana	Not covered	Considered not medically necessary; not reimbursed.

Abbreviations: CNS, central nervous system; CPT, current procedural terminology.

Table 2. *Cost-Effectiveness of Scalp Cooling Therapy Compared With Future Dermatologic Management Alternatives for CIA.*

Strategy	Cost Estimation ($)	Total Cost ($)	QALY (1 year)	Incremental Cost ($)	QALY Gain	ICER, ($/QALY)
Scalp cooling	Device use + session costs = 2,000	2,000	0.90	N/A	N/A	N/A
Dermatology management + 1-year minoxidil	Dermatology visits (3 visits × 200 = 600) + minoxidil (15/month × 12 = 180)	780	0.50	1,220	0.40	3,050/QALY
Dermatology management + 1-year minoxidil + PRP	Standard therapy (780) + PRP (3 sessions × 800 = 2,400)	3,180	0.50	–1,180	0.40	–2,950/QALY

Abbreviations: CIA, chemotherapy-induced alopecia; ICER, incremental cost-effectiveness ratio; PRP, platelet-rich plasma; QALY, quality-adjusted life year.

mated using direct patient cost data and GoodRx pricing (Table 2).[10,11]

Quality-adjusted life years (QALYs) were calculated as QALY = utility × time (years). No studies have directly assessed utility values for CIA; therefore, we used time trade-off values from patients with alopecia areata.[12] Patients without scalp cooling (complete hair loss) were assigned a median utility of 0.50, while those receiving scalp cooling (partial or substantial hair preservation) were assigned 0.90. The resulting QALY gain from scalp cooling was 0.40.

The incremental cost-effectiveness ratio (ICER) was calculated as:

$$ICER = \frac{Cost_{scalp\ cooling} - Cost_{comparison\ group}}{QALY_{scalp\ cooling} - QALY_{comparison\ group}}$$

The ICER for scalp cooling versus dermatologic management plus minoxidil was +$3,050 per QALY, indicating greater effectiveness at higher cost. The ICER for scalp cooling versus dermatologic management plus minoxidil and PRP was –$2,950 per QALY, indicating scalp cooling was more effective and less costly. Both ICERs are well below commonly cited United States willingness-to-pay thresholds ($50,000–$150,000 per QALY), supporting the cost-effectiveness of scalp cooling.[13,14]

Limitations of QALY-based analyses should be acknowledged. Utility values may underestimate the experience of patients with chronic illness, disability, or older age, and population-based utilities may not capture individual experiences. Despite these limitations, QALYs provide a standardized, quantitative metric for evaluating the effectiveness of interventions in health policy and economic analyses.

Conclusion

CIA is primarily managed by oncology teams, with patients often seeking dermatologic care for follow-up hair loss management. Based on QALY and ICER analyses, scalp cooling (cold capping) is more effective and, in some comparisons, less costly than delayed dermatologic interventions after alopecia onset. These findings support scalp cooling as a cost-effective supportive care intervention and suggest that insurance coverage should be considered as standard for patients at risk of CIA.

Potential conflicts of interest

Steven R. Feldman, MD, PhD, has received research, speaking, and/or consulting support from numerous companies, including Galderma, GSK/Stiefel, Almirall, Leo Pharma, Boehringer Ingelheim, Mylan, Celgene, Pfizer, Valeant, AbbVie, Samsung, Janssen, Lilly, Menlo, Merck, Novartis, Regeneron, Sanofi, Novan, Qurient, National Biological Corporation, Caremark, Advance Medical, Sun Pharma, Suncare Research, Informa, UpToDate, and the National Psoriasis Foundation. He is founder and majority owner of DrScore.com and founder and part owner of Causa Research, a company focused on improving patient adherence. The remaining authors report no conflicts of interest.

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