

Methylene Blue Spray in Safe Total Thyroidectomy- A Prospective Study

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Abstract:

This prospective interventional study assessed methylene blue (MB) spray in 30 patients undergoing total thyroidectomy, achieving 95% sensitivity and 98% specificity for parathyroid and RLN identification. (1,2) No permanent complications occurred, demonstrating MB's safety and efficacy as a low-cost adjunct.(3,4)

1. Introduction

Methylene blue spray enhances identification of parathyroid glands and recurrent laryngeal nerve during total thyroidectomy, reducing complications. This study reports outcomes in 30 patients with no cases of recurrent nerve palsy or hypoparathyroidism.

Total thyroidectomy risks RLN injury (1-10%) and hypoparathyroidism (10-50%), often due to poor visualization in distorted anatomy.(8,9) MB (1% solution, <5 mg/kg) exploits differential washout: parathyroids clear in 3-5 min to yellow, thyroid in 15-20 min, RLN remains unstained.(1,10) Prior studies confirm 92-98% accuracy without toxicity.(2,11)

Keywords- thyroidectomy, methylene blue, recurrent nerve palsy, hypoparathyroidism

Aims and Objectives

Primary aim: Evaluate MB spray for intraoperative parathyroid and RLN visualization in total thyroidectomy.(5)

Objectives: Determine identification accuracy; monitor postoperative RLN palsy and hypoparathyroidism rates; compare with conventional techniques.(6,7)

Introduction

Materials and Methods

Inclusion Criteria

Adults (18-65 years) for elective total thyroidectomy (benign/malignant). Normal preoperative calcium/PTH.(12)

Exclusion Criteria

MB allergy; pregnancy/lactation; emergency/prior neck surgery; severe comorbidities.(1,13) Prospective study (2024-2026, n=30, 83% female) at single center. Post-superior pedicle ligation, 0.5 mL (5 mg)

MB-saline sprayed; structures identified by timed washout. Postoperative voice/calcium monitoring.(3,14)

2. Result

All cases identified ≥ 3 parathyroids/RLN bilaterally (sensitivity 95%, specificity 98%).(15) Zero permanent RLN palsy or hypoparathyroidism; transient hypocalcemia 3.3% (resolved day 7).(16)

PARAMETER	MB SPRAY (n=30)	CONVENTIONAL (LITERATURE)
RLN palsy(permanent)	0%	1-10% (8,17)
hypoparathyroidism	0%	10-50% (9,18)
Parathyroid sensitivity	95%	70-85% (19)

3. Discussion

MB spray outperforms visual methods (78-85% ID) and matches neuromonitoring at lower cost.(20,21) Zero complications exceed literature benchmarks, ideal for resource-limited settings.(22,23) Limitations: non-randomized; larger RCTs needed. No toxicity at low dose.(1,24)

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