# Single-Institution Experience with [$^{131}$I]MIBG for Pheochromocytoma and Paraganglioma: Long-Term Outcomes and Dosimetry

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## INTRODUCTION

- I-131 high-specific-activity MIBG ([$^{131}$I]MIBG) is the only FDA-approved radiopharmaceutical for metastatic pheochromocytoma/paraganglioma (PHEO/PGL).
- Commercial production of [$^{131}$I]MIBG ceased in 2023, limiting clinical availability.
- Here, we present our institution's long-term efficacy, safety, and dosimetry data.

## MATERIALS AND METHODS

- A retrospective review of patients with metastatic PHEO/PGL who received [$^{131}$I]MIBG was performed.
- Radiographic response was assessed using RECIST 1.1 criteria, and toxicities were graded using CTCAE v5.0.
- Demographics, clinical presentation, laboratory values, and outcomes were assessed. Dosimetry was used to estimate absorbed dose to the kidneys, liver, and lungs, and reduce activity when necessary.
- Median progression-free survival (PFS) was estimated using the Kaplan-Meier method.

## RESULTS

- Between 2020–2024, seven patients with metastatic PHEO (n=4) or PGL (n=3) were treated with [$^{131}$I]MIBG.
- Mean follow-up was 27.7 months (range: 5.6 – 60.3).
- Best responses included complete response (n=1), partial response (n=2), stable disease (n=2), and progressive disease (n=2), yielding an objective response rate of 42.9% and disease control rate of 71.4%. Only PHEO patients had objective responses.
- At last follow-up, 2/3 patients with PGL had died. No patients with PHEO died during the study period.
- Overall median PFS was 35.3 months. The median PFS and OS for patients with PGL were 2.5 months and 9.6 months, respectively. 2/3 (67%) patients with PGL experienced progression and death within 1 year, compared to 0/4 (0%) with progression or death in the PHEO group.
- Only 1/4 (25%) with PHEO progressed during the study period.
- Post-progression therapies included [177Lu]Lu-DOTATATE (n=2), chemotherapy (n=1), and external beam radiation (n=1).
- 5/7 (71%) patients experienced myelosuppression. Transient G3/G4 anemia occurred in 2/7 (29%), leukopenia in 2/7 (29%), and G4 thrombocytopenia in 1/7 (14%). None developed G3/G4 nephrotoxicity.

## Patient Demographics

| | |
|---|---|
| Age | 63.7 years (range: 31 – 69) |
| Sex | |
| Female | 2 (29%) |
| Male | 5 (71%) |
| Cancer Type | |
| Metastatic pheochromocytoma | 4 (57%) |
| MEN2A mutation | ¼ (25%) |
| Metastatic paraganglioma | 3 (43%) |
| SDHB mutation | 2/3 (66%) |
| Prior Treatments | |
| Surgery | 6 (85%) |
| Chemotherapy | 1 (14%) |
| SBRT | 1 (14%) |
| # of [$^{131}$I]MIBG cycles | |
| Only 1 Cycle | 2/7 (29%) |
| 2 cycles | 5/7 (71%) |

## Patient Outcomes

| Patient | Tumor | Best Response | PFS (months) |
|---|---|---|---|
| P1 | PHEO | PR | 19.1* |
| P2 | PGL | PD | 0.90 |
| P3 | PGL | SD | 52.1 |
| P4 | PGL | PD | 2.5 |
| P5 | PHEO | CR | 35.3 |
| P6 | PHEO | SD | 21.7* |
| P7 | PHEO | PR | 15.7* |

***PFS Censored**: No progression at last imaging.*

## DOSIMETRY

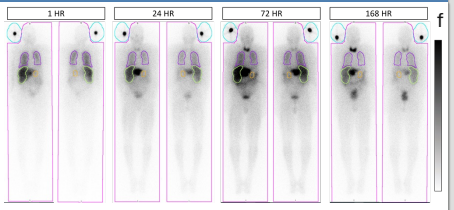


*Figure: Whole-body planar images used for dosimetry calculation*

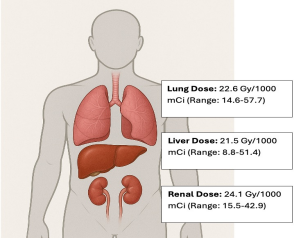


*Figure: Average organ dose (Gy) per 1000 mCi*

## CONCLUSION

- [$^{131}$I]MIBG therapy resulted in prolonged disease control in metastatic PHEO/PGL with limited toxicity.
- Median PFS exceeded 35 months across the cohort; however, patients with pheochromocytoma appeared to have a better response to treatment versus patients with paraganglioma, with higher response rates with fewer cases of progression and death.
- The most common adverse event was bone-marrow suppression.
- These real-world findings support [$^{131}$I]MIBG as an important option for select patients.

**Citations:**

Carrasquillo JA, Pandit-Taskar N, Chen CC. I-131 Metaiodobenzylguanidine Therapy of Pheochromocytoma and Paraganglioma. Semin Nucl Med. 2016 May;46(3):203-14. doi: 10.1053/j.semnuclmed.2016.01.011. PMID: 27067501.