Updates from the Pediatric Nuclear Medicine Dose Reduction Working Group
S. Ted Treves, MD

1. What activities should be considered towards dose reduction in Pediatric Nuclear Medicine?

   A. Education
   B. Appropriateness of Indications
   C. Optimization of acquisition and display protocols
   D. Application of Advanced Image Processing
   E. All of the above

Correct Answer: E

Reference

Multimodality Imaging of Neuroblastoma
Susan E. Sharp, MD

2. Which statement regarding the International Neuroblastoma Risk Group Staging System (INRGSS) is false?

   A. Allows pre-surgical staging of localized tumors.
   B. Requires CT and/or MRI of the primary tumor as part of the staging evaluation.
   C. Requires I-123-MIBG as part of the staging evaluation.
   D. Requires F-18-FDG PET as part of the staging evaluation.
   E. None of the above.

Correct Answer: D

Reference
Curie Scoring - Prognostic Implications: How to do It
Marguerite T. Parisi, MD, MS Ed

3. At which of the following time points is the Curie score most predictive of patient survival in children with high risk neuroblastoma?

   A) At diagnosis
   B) At end of induction therapy
   C) Following bone marrow transplant
   D) After biotherapy

Correct Answer: B

Reference

Advances in Neuroblastoma Therapy: The role of I-131 MIBG
Meaghan P. Granger, MD

4. The risk of thyroid hypofunction following I131-MIBG is minimized by which of the following interventions?

   A. Thyroid protection with lead shielding
   B. Low dose potassium iodide (KI) administration prior to therapy
   C. High dose potassium iodide (KI) administration prior to therapy and prolonged low dose following therapy
   D. Potassium perchlorate (KClO4) following therapy

Correct Answer:  C

References
2. Primary hypothyroidism and 131I-MIBG therapy in neuroblastoma. Lancet 1993;342:57. 15. van Santen HM, de Kraker J, van Eck BL, de Vijlder JJ, Vulsma T.
5. Which of the following is the mechanism by which I\textsubscript{131}-MIBG is taken up into neuroblastoma cells?

A. GD2 receptor  
B. IL-2 receptor  
C. Retinoic Acid receptor  
D. Norepinephrine transporter

Correct Answer: D

References

Developing an Institutional I\textsubscript{131} MIBG Therapy Program: Key Issues  
Frederic Fahey, PhD

6. Which of the following characteristics would NOT be considered an asset when selecting a hospital room for a pediatric patient receiving I\textsubscript{131} MIBG therapy?

A. Dedicated bathroom with sink  
B. Adjacent to other patient rooms  
C. Corner or isolated location  
D. Nearby area for family and caregivers  
E. Access to oncologic nurses, child life professionals and other support staff

Correct Answer: B

Reference

Reducing Dose to Nuclear Medicine Personnel During I\textsubscript{131} MIBG Therapy  
Michael J. Gelfand, MD

7. When very large therapeutic dosages are being administered to patients, key factors in reduction of radiation dose absorbed by nuclear medicine technologists are:

A. Use of shielding appropriate for the radionuclide and the task.  
B. Analysis of the individual tasks by careful estimation of time and distance from the radioactive source for each individual task.  
C. Measurement of absorbed radiation dose received during each task.  
D. A and B  
E. A and C.

Correct Answer: E
Radiolabeled Somatostatin Analogues for Treatment of Neuroendocrine Tumors
Yusuf Menda, MD

8. The dose limiting toxicity with peptide receptor radionuclide therapy with Yttrium-90 DOTATOC is:

   A. renal toxicity
   B. hepatotoxicity
   C. salivary gland toxicity
   D. bone marrow toxicity

Correct Answer: A

9. The target for In-111 Octreotide is:

   A. somatostatin receptor subtype 2
   B. glucose transporter 2
   C. melanocortin receptor subtype 2
   D. NaI symporter

Correct Answer: A

Reference
11. Which of the following imaging modalities is most sensitive to detect ectopic thyroid tissue when evaluating for congenital hypothyroidism?

A. US
B. NM Scintigraphy
C. CT
D. MRI

Correct Answer: B

Fine Needle Biopsy in Children with Thyroid Nodules

12. Following ultrasound features of a thyroid nodule are highly suggestive of PTC malignancy EXCEPT:

A. Presence of micro calcifications
B. Irregular infiltrative margins
C. Solid nodule appearing hypoechoic compared to normal thyroid parenchyma
D. Increased nodular vascularity
E. Spongiform appearance

Correct Answer: E


13. Indications for routine FNA (fine needle aspiration) for a sub centimeter nodule include all of the following EXCEPT:

   A. Family history of PTC
   B. History of external beam radiation in childhood
   C. Well defined nodule, but hypoechoic as compared to adjacent normal thyroid parenchyma
   D. PET positive nodule
   E. 5 mm nodule associated with abnormal adjacent lymph node
   F. Small nodule associated with micro calcifications

Correct Answer: C

References


14. A 7-year-old, 25 kg girl is diagnosed with a follicular variant PTC, mT3N₁bMₓ, and is status post total thyroidectomy and a comprehensive compartment-focused neck dissection by an experienced thyroid surgeon who performs over 100 thyroid cancer surgeries a year. A CXR at diagnosis was negative for pulmonary metastases and the lung fields on a pre-operative contrast-enhanced CT neck did not reveal pulmonary metastases in the upper lung fields. After a documented normal 24-hour urine iodine level, she is now ready for further evaluation and possible treatment with $^{131}$I. Recognizing that the treatment of pediatric PTC is evolving, which of the following statements is correct?

A. A diagnostic scan using $^{123}$I is unlikely to add any additional diagnostic information; based upon her pathological findings and high risk of pulmonary metastases, the patient should receive an empiric dose of 150 mCi $^{131}$I and have a post-treatment scan performed 7 days after treatment

B. Dosimetry should be planned and the patient administered the highest $^{131}$I dose that will limit her blood/bone marrow radiation dose to <200 cGy

C. If pulmonary metastases are identified, due to her increased risk of death from PTC, a second high dose of $^{131}$I should be planned for 6 months after the first dose

D. Treatment using rhTSH (instead of thyroid hormone withdrawal) is preferred because large randomized clinical trials have demonstrated safety and efficacy in pediatric patients with similar clinical presentations

E. A diagnostic scan using $^{123}$I and a stimulated thyroglobulin at the time of the diagnostic scan may help to determine the appropriate dose of RAI, if needed

Correct Answer: E

References


Radioimmunotherapy of Lymphoma
Hedieh Eslamy, MD

15. A bio-distribution scan for the $^{90}$Y-ibritumomab tiuxetan radioimmunotherapy regimen is shown below. Which choice is FALSE?

A. This regimen was FDA approved for the treatment of relapsed low-grade and follicular NHL in 2002
B. Rituximab is a murine monoclonal antibody (MAb)
C. $^{111}$Indium is the radiotracer used for imaging
D. Prior to the injection of the radiolabelled MAb, preloading is performed with unlabeled MAb to minimize the antigen sinking effect
E. $^{90}$Yttrium is a beta emitter

Correct Answer: B

References