NMAA Exam Content Outline

I. Patient Care (Assessment, Management and Education)
   a. Patient Based Decision Making
      i. Patient and family education
      ii. Patient history and physical examination
     iii. Evaluation of Diagnostic and Laboratory Results
        1. Cardiac function and myocardial injury
        2. Hepatic function
        3. Pulmonary function
        4. Renal function and electrolytes
        5. Thyroid function
        6. Parathyroid function
        7. Complete Blood Count (CBC)
        8. Blood glucose
        9. Pregnancy tests (HCG)
     iv. Identify and implement a plan of care
        1. Order and administer sedation
        2. Alternative options
     v. Administration into existing catheters or routes
        a. VP shunts
        b. Central lines
        c. Intra thecal
        d. Intra arterial
     vi. Establish additional routes of administration
        a. Urinary catheter
        b. Feeding tube
        c. Rectal
        d. Subcutaneous port
        e. Intradermal
     vii. Monitor vital signs and physiologic parameters
     viii. Evaluate the need for contrast media
   b. Systems Based Practice
      i. Medical/Legal/Professional/Government/Regulatory
         1. Standards for Informed Consent
         2. Elements of written directives
         3. HIPAA
         4. Medical events and incidents
      ii. Quality Assurance and Management
         1. Patient safety
   c. Patient Emergency Management
      i. Provide supportive medical management
         1. Advanced life support
         2. Blood glucose management
         3. contrast media reactions
         4. allergic response
         5. adverse response

II. Clinical Procedures
   a. Cross sectional imaging anatomy
   b. Pathophysiology
   c. Patterns of biodistribution for radiopharmaceuticals
   d. Identify and/or assess for each diagnostic procedure:
      i. Indications and Contraindications
      ii. Patient preparation
      iii. Existing correlative examinations

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iv. Complications
v. Limitations
vi. Appropriate Radiopharmaceutical
vii. Radiopharmaceutical dose range
   1. Adjustment for patient size and age
viii. Route of administration
ix. Imaging technique
x. Image quality and need for additional imaging
xi. Quantitative data analysis
xii. Need for pharmacological interventions in nuclear medicine procedures (Appendix B- Adjunctive Drugs)

xi. Need for complementary/correlative diagnostic imaging procedures

e. Analyze Results
   i. Assess image quality and other associated data
      1. Adequacy
      2. Artifact
      3. Incidental findings

f. Therapy
   i. Identify and/or assess for each therapeutic procedure:
      1. Indications and Contraindications
      2. Patient preparation and informed consent
      3. Existing correlative examinations
      4. Complications
      5. Limitations
      6. Appropriate Radiopharmaceutical
      7. Radiopharmaceutical dose range
      8. Route of administration
      9. Dosimetry and dosimetric consequences
      10. Patient release requirements
      11. Need for complementary/correlative diagnostic imaging procedures

III. Diagnostic and Therapeutic Pharmaceuticals
   a. Knowledge of drug characteristics:
      i. Mechanism of action
      ii. Indications of use
      iii. Contraindications
      iv. Appropriate management of adverse events and/or side effects
v. Appropriate follow-up and monitoring of pharmacologic effects
vi. Drug toxicity
vii. Cross reactivity of similar medications

b. Special considerations for contrast media agents:
   i. Premedication
   ii. Hydration status
   iii. Renal status
   iv. Diseases of concern
   v. Incompatible medications
   vi. Allergies
   vii. Appropriate management of adverse events and/or side effects
   viii. Conflicts with other procedures (e.g. another contrast procedure)

c. Methods to reduce medication errors
d. Evaluating and reporting adverse drug events
e. Pharmacology

   Appendix B- Adjunctive Drugs
   Appendix C- Radiopharmaceuticals
   Appendix D- Contrast Agents

IV. Radiation Safety and Radiobiology in Clinical Practice
   a. Radiation Safety
      i. Understanding of absorbed dose principles
         1. Knowledge of critical organ versus total body effective dose equivalent
         2. Typical values from routine nuclear medicine procedures
         3. Typical values from CT
            a. Diagnostic versus attenuation correction
            b. Pediatric versus adult
            c. Dose units
      ii. Methods to reduce patient exposure
      iii. Methods to reduce occupational exposure
   b. Radiobiology
      i. Cell Growth and Division
      ii. Radiosensitivity of cells
      iii. Effects of radiation
         1. Deterministic effects versus stochastic effects
         2. Background radiation
         3. Dose-response relationships
         4. Skin effects
         5. Acute radiation syndrome
         6. Local tissue damage
         7. Hematological effects
         8. Carcinogenesis
         9. Fetal effects
        10. Genetic effects
        11. Fertility effects
   iv. Dosimetry calculations
      1. Fetal calculations
      2. Organ calculations
      3. Whole body calculations