RADIONUCLIDE STUDIES IN THE MANAGEMENT OF PAINFUL TESTICULAR PATHOLOGY

Isabel Roca
ACUTE TESTICULAR PAIN

Differential Diagnosis
→ testicular torsion
→ epididymitis

Basis - Prerequisites
→ careful clinical exam
→ good clinical history
Radiopharmaceutical

$^{99m}\text{Tc-TcO}_4^-$

Recommended Dose

→ minimum 37 MBq
→ Adult 370 MBq
→ Dosage Card: fraction of adult administered activity
### Minimum Optimal Dose

**Paediatric Task Group**

<table>
<thead>
<tr>
<th>Fraction of Adult Administered Activity</th>
<th>3 kg = 0.1</th>
<th>4 kg = 0.14</th>
<th>6 kg = 0.19</th>
<th>8 kg = 0.23</th>
<th>10 kg = 0.27</th>
<th>12 kg = 0.32</th>
<th>14 kg = 0.36</th>
<th>16 kg = 0.40</th>
<th>18 kg = 0.44</th>
<th>20 kg = 0.46</th>
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<tbody>
<tr>
<td>22 kg = 0.50</td>
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<td>24 kg = 0.53</td>
<td>26 kg = 0.56</td>
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<td>28 kg = 0.58</td>
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<td>32 kg = 0.65</td>
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<td>36 kg = 0.71</td>
<td>38 kg = 0.73</td>
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<td>42 kg = 0.78</td>
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<td>46 kg = 0.82</td>
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<td>48 kg = 0.85</td>
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<td>50 kg = 0.88</td>
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<td>52-54 kg = 0.90</td>
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<td>56-58 kg = 0.92</td>
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<td>60-62 kg = 0.96</td>
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<tr>
<td>64-66 kg = 0.98</td>
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<td>68 kg = 0.99</td>
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</tbody>
</table>

**RECOMMENDED DOSE**

Paediatric Task Group

EANM

**Eur Jour Nucl Med**

1990;17:127-9
TESTICULAR SCINTIGRAPHY

Preparation:
optional, recommended
→ Potassium perchlorate
  † 6 mg/kg
  † adults: 500 mg
  † before examination
→ Lugol
  † adults: 10 / 12 hours
  † 2 days before examination

Block the thyroid uptake of pertechnetate
DETECTION: preparation

→ Penis
  † placed over the symphysis pubis
  † use adhesive tape

→ Injection
  † veins of upper extremities

→ Scrotum in adults and older children
  † between separated low extremities
  † optional lead shielding over the thighs
TESTICULAR SCINTIGRAPHY

DETECTION:

→ RADIONUCLIDE ANGIOGRAPHY
  ✦ flow phase
  ✦ 1 frame/1-3 sec 60 sec

→ STATIC SCROTAL SCINTIGRAPHY
  ✦ immediately
    after angiography
  ✦ 300-500 KCounts
    or 2-5 minutes
DETECTION:

† bladder shielding:

- rarely necessary (late images)

† young children:
  - zoom or pinhole if necessary
  - 2 mm hole
  - 150 KC
  - caudal projection (avoid bladder)
NORMAL IMAGE: ANGIOGRAPHY

→ relative low flow in the scrotum
  ✤ iliac and femoral vessels
  ✤ diffuse activity in pelvis and thighs

NORMAL IMAGE: STATIC

→ TESTES: similar activity as thighs
→ SCROTUM: symmetric and homogeneous uptake
ACUTE TESTICULAR TORSION

→ Torsion of the spermatic cord, caused by
  ✫ sudden twisting
  ✫ constriction of blood vessels
    → acute compromise and ischaemia of the testicle
    → oedema of the testis and cord

PROLONGED TESTICULAR TORSION

→ haemorrhagic infarction of the testis
TESTICULAR SCINTIGRAPHY

ACUTE TESTICULAR TORSION

SYMPTOMS
→ sudden onset of scrotal pain
→ nausea, vomiting

→ sometimes intermittent

AGE
→ newborns to > 18 years
→ most cases: 12-18 years
   ♦ rapid growth of genitalia
ACUTE TESTICULAR TORSION

PHYSICAL EXAMINATION

→ swollen
→ tender
→ elevated testis
→ scrotal oedema
→ discolored scrotum
→ secondary hydrocele
TESTICULAR SCINTIGRAPHY

IMPORTANCE OF PROMPT DIAGNOSIS

TESTICULAR SALVAGE RATE
→ 80 % patients operated ≤ 5 hours
→ 20 % patients operated ≥ 10 hours

EMERGENCY SCROTAL SCINTIGRAPHY
→ NOT indicated if history of scrotal pain or swelling ≥ 24 hours
SCINTIGRAPHY OF THE ACUTE TORSION

≤ 24 hours from the onset of the symptoms

→ RADIONUCLIDE ANGIOGRAPHY
  ♦ normal pattern
  ♦ rarely: decreased perfusion in the involved side

→ STATIC SCROTAL IMAGE
  ♦ reduced tracer uptake
  ♦ absent affected side
  ♦ few hours after the onset of symptoms:
    * RIM of slightly increased uptake surrounding the involved testicle
SCINTIGRAPHY OF THE LATE TORSION

≥ 24 hours from the onset of the symptoms

→ RADIONUCLIDE ANGIOGRAPHY
   ✫ central region of low or absent flow in the affected hemiscrotum
   ✫ usually surrounded by a peripheral rim of high perfusion

→ STATIC SCROTAL SCINTIGRAPHY
   ✫ region of reduced to absent tracer uptake in the testicle, surrounded by a rim or halo of increased tracer → reactive hyperaemic response in scrotal tissues to ischaemia
EPIDIDYMITIS

→ Adolescence

→ Symptoms
  ✫ Swollen
  ✫ tender epididymis or testis
  ✫ history of fever or UTI

→ Scintigraphy
  ✫ Angiography:
    increased blood flow
  ✫ Static Image:
    intense area of increased uptake
  ✫ abscess: similar to late torsion
young boy

normal

hydrocele
TESTICULAR SCINTIGRAPHY

ACUTE TORSION

8 hours

24 hours
« BURNED » TORSION EPIDIDYMITEMITIS
DOPPLER ULTRASOUND

NORMAL

TORSION
DOPPLER ULTRASOUND

EPIDYMITIS