LOW DOSE THALLIUM-201 PROTOCOL
WITH A CADMIUM-ZINC-TELLURIDE (CZT) CARDIAC CAMERA
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Background:

- Thallium-201 is an efficient radiotracer for myocardial perfusion imaging with:
  - a better myocardial uptake (×3)
  - a better linearity with myocardial blood flow

But Thallium-201 leads to a relative high radiation exposure for patients:

- Usually 25 mSv
- Effective dose with thallium-201: 0.16 mSv/MBq for 70 kgs

Efficiency of new CZT cameras is multiplicated by 6

Methods:

- prospective inclusion of 137 consecutive patients referred for a stress myocardial scintigraphy (129 exercise, 8 dipyridamole) and previously explored in our department

Comparison of 2 myocardial scintigraphies:

- a previous scan performed in the last 5 years with a conventional dual head tomographic Anger camera (CC) and a regular injected activity of thallium-201
  - 1.6 MBq/kg
  - 10 to 16 mn SPECT acquisition (Philips Axis)
  - redistribution with reinjection (37 MBq) when abnormal stress scan

- a CZT scan with a low injected activity of thallium-201:
  - 1 to 1.2 MBq/kg
  - 5 to 8 mn acquisition on CZT GE DNM 530c
  - redistribution with reinjection (one third of the stress injected activity) when abnormal stress scan

Discussion:

- Decrease of injected activities from 1.6 to 0.7 MBq/kg effective dose = 8 mSv

Discussion:

- Calculated effective dose was less than 12 mSv when no reinjection (additional dose of 4 mSv when reinjection).
- High myocardium counts rate allowed us to decrease more the injected activity, down to 0.7 MBq/kg, leading to an effective dose of 8 mSv at stress, with an increase of the acquisition time up to 10 mn in maintaining the acquired myocardial counts over 300 Kcts.
- Additionally, because of less artifacts, more patients have only stress imaging, contributing to a decrease of radiation exposure but also to shorter protocols and less expansive tests.

Conclusion:

- With reduced activities of thallium 201, CZT camera gives high myocardium counts rate and reliable high quality imaging.
- With our present injected activity of 0.7 MBq/kg, the effective dose goes down to 8 mSv.