

EVALUATION OF THE SCAN PROTOCOL IN THE MEASUREMENTS OF CORONARY ARTERY CALCIUM: IMAGE QUALITY



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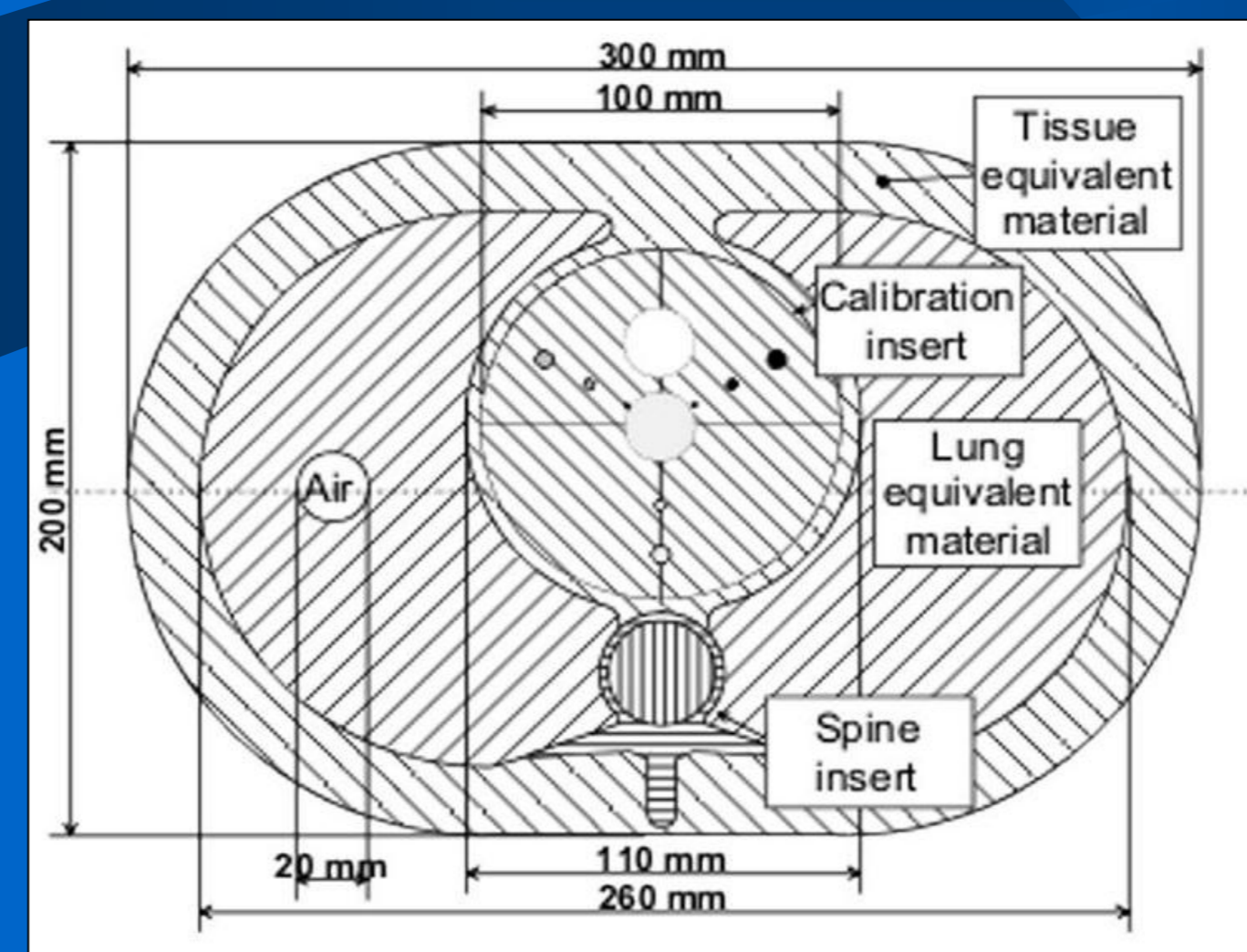


INTRODUCTION

- The amount of calcium deposits in the coronary arteries is an indirect marker of total atherosclerotic and has been strongly associated with **future cardiac events in asymptomatic patients**;
- As calcium has high X-ray attenuation, the detection can be easily performed with a **gated non-contrasted CT of the heart**;
- This procedure increased significantly in recent years, providing great clinical benefit for patients, however **the collective dose was increased considerably**;
- **Objective: to evaluate the influence of the tube current applied for studies of calcium score.**

MATERIAL AND METHOD

- **Institutions:** two private clinics of Rio de Janeiro.
- **CT Scanners:** 64-slice and 256-slice.
- **Scan Parameters:** 80, 120 and 140 kV and 30 to 220 mAs.
- **Phantom:** Cardiac phantom (QRM GmbH, Germany), simulating a large adult thorax attenuation:
 - 9 varying size compartments, simulating cardiac calcification (200, 400 and 800 mg HA/cm³).
- **Agatston and Mass CS:** automatically calculated with a dedicated offline software.
- **Noise:** standard deviation measurement in a ROI placed inside a phantom water compartment.
- **Radiation dose:** DLP obtained in scanner report; $E = DLP \times 0.014$ (conversion factor for chest).

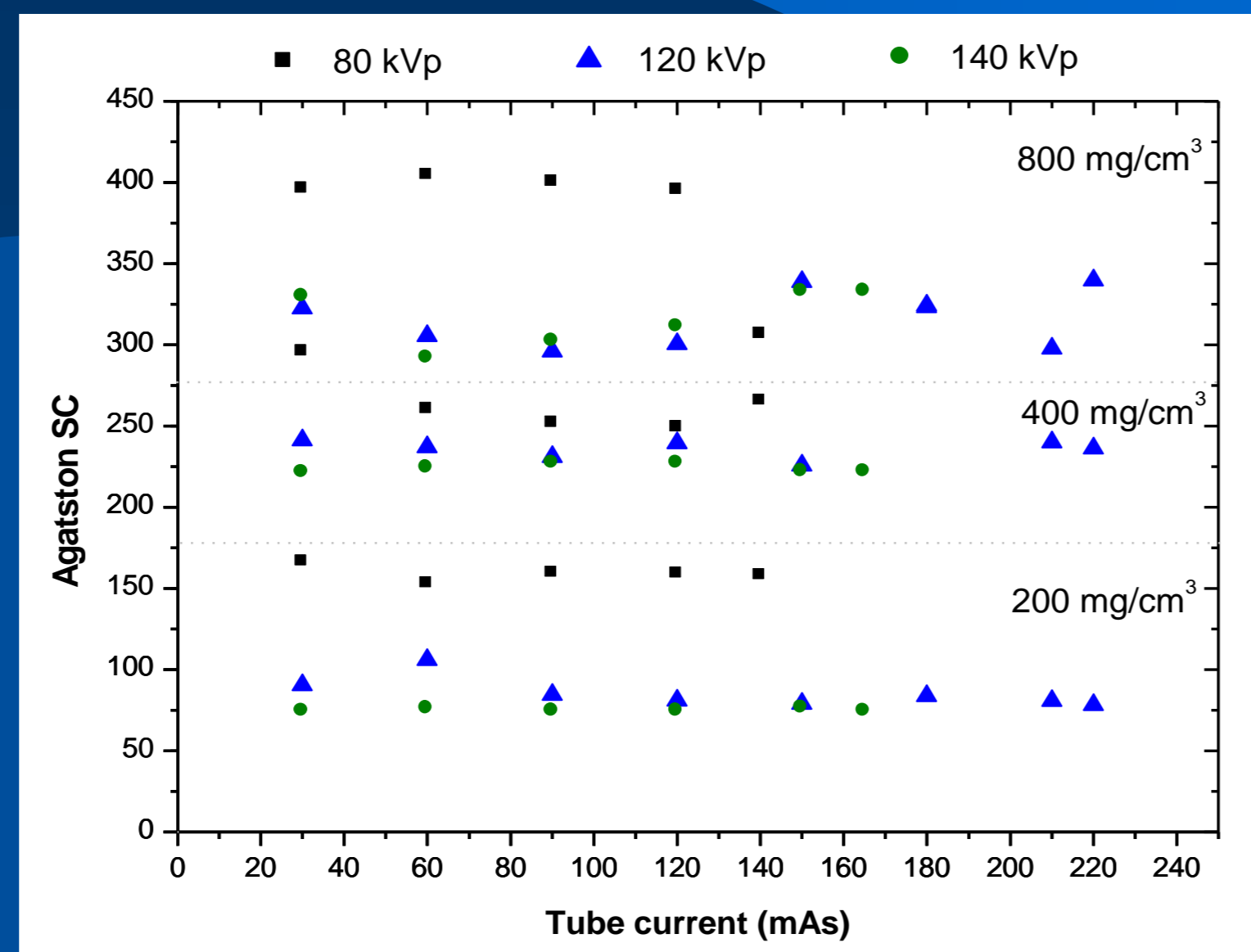
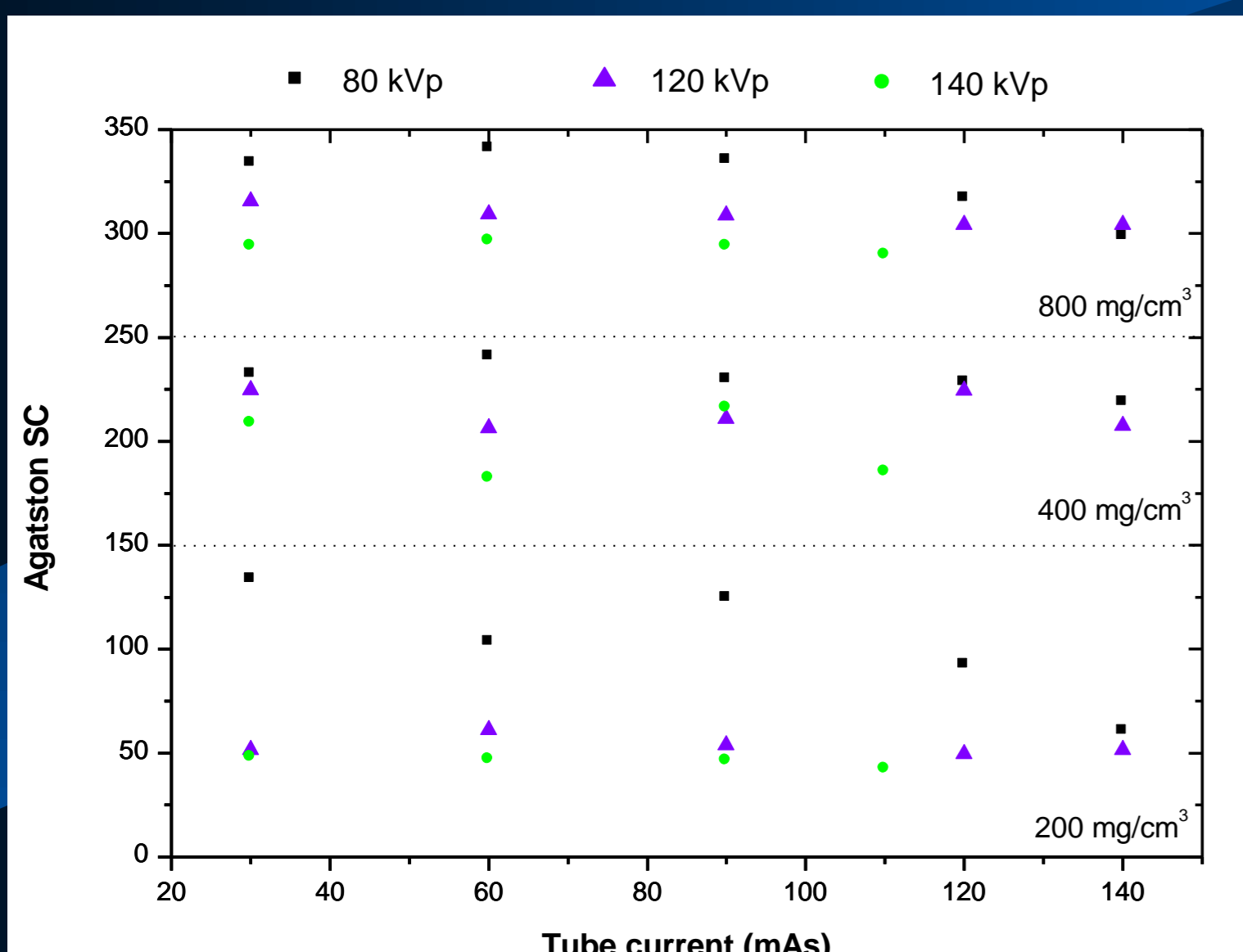


RESULTS AND DISCUSSIONS

1. Agatston Score:

64-slice

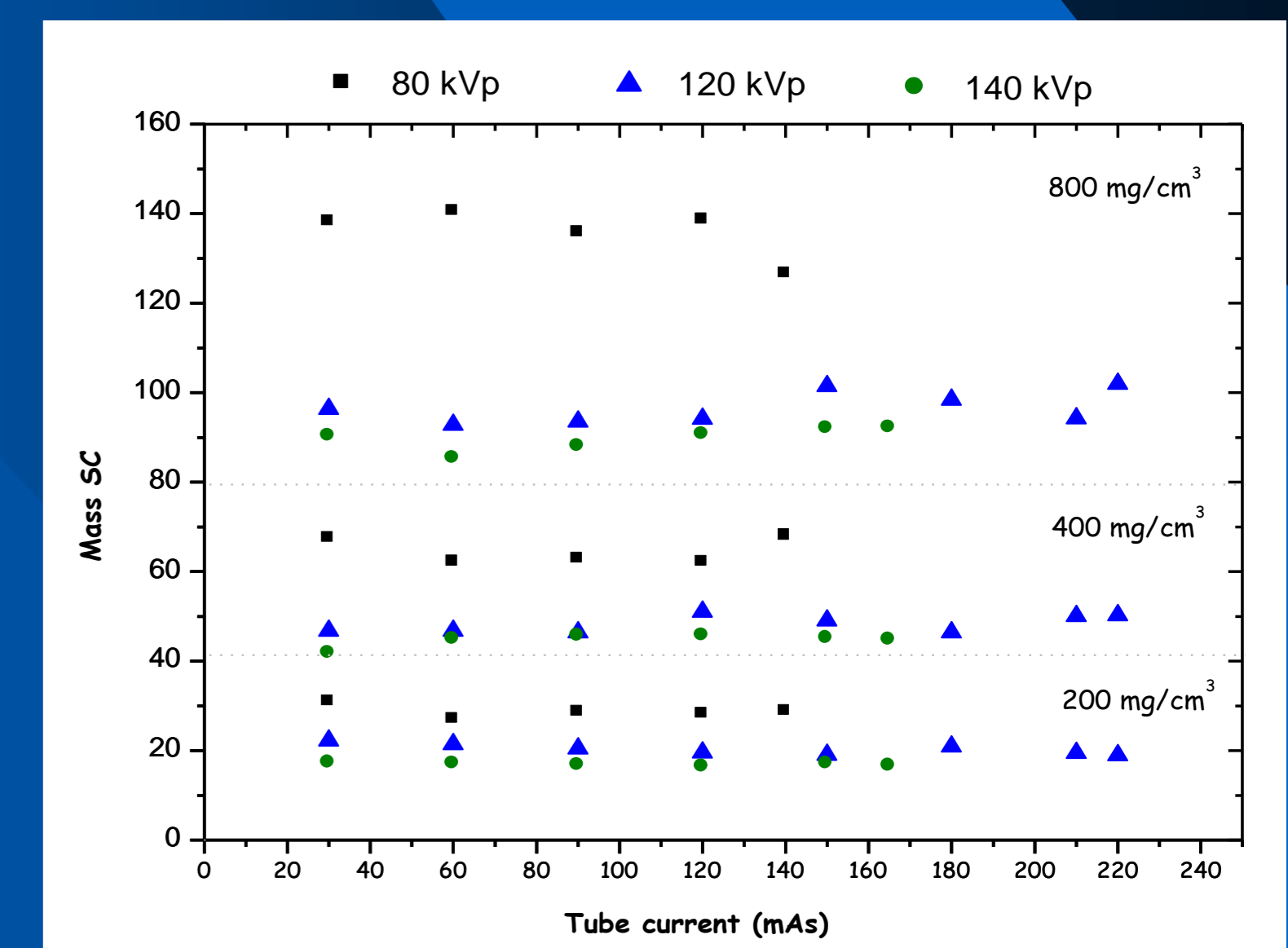
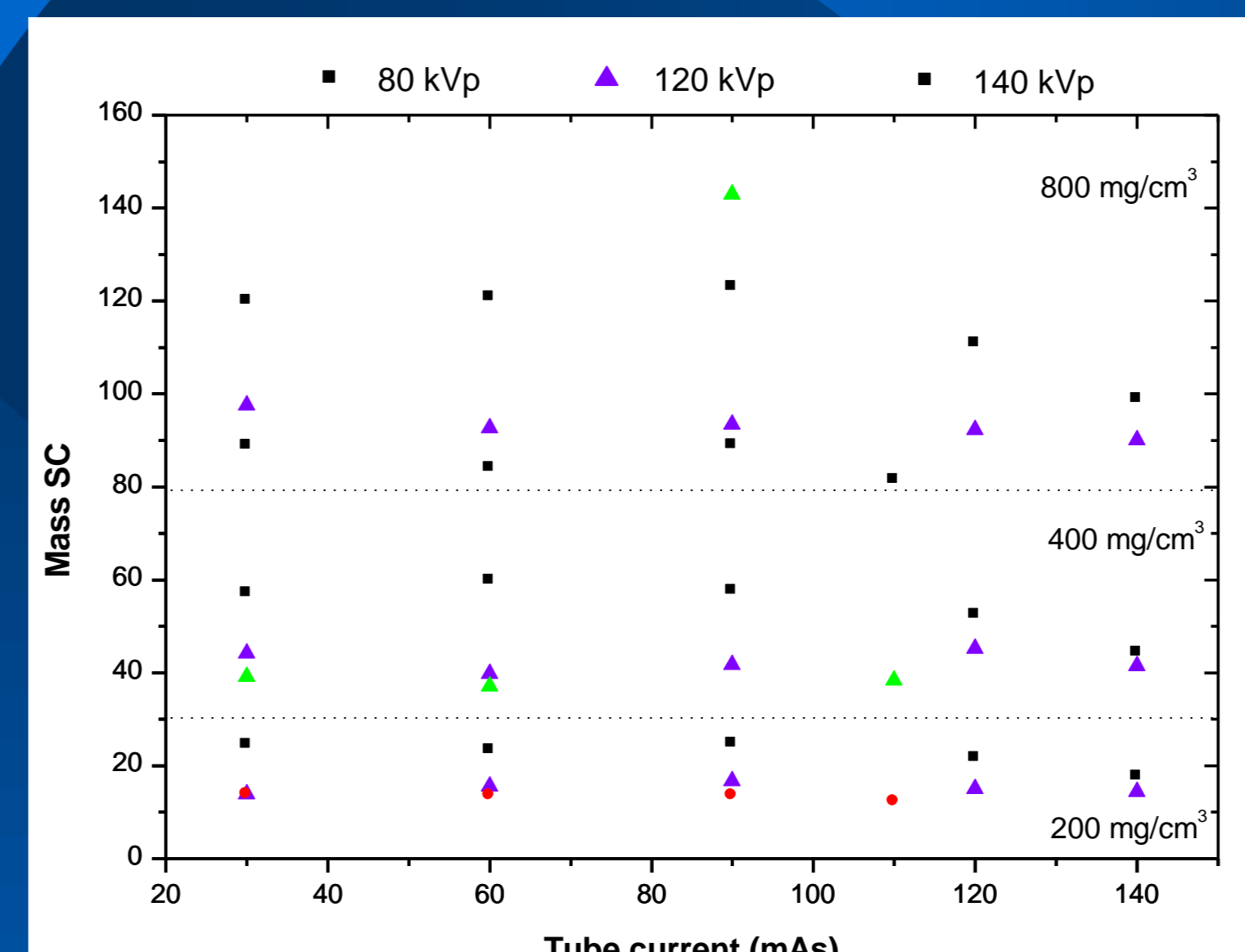
256-slice



2. Mass Score

64-slice

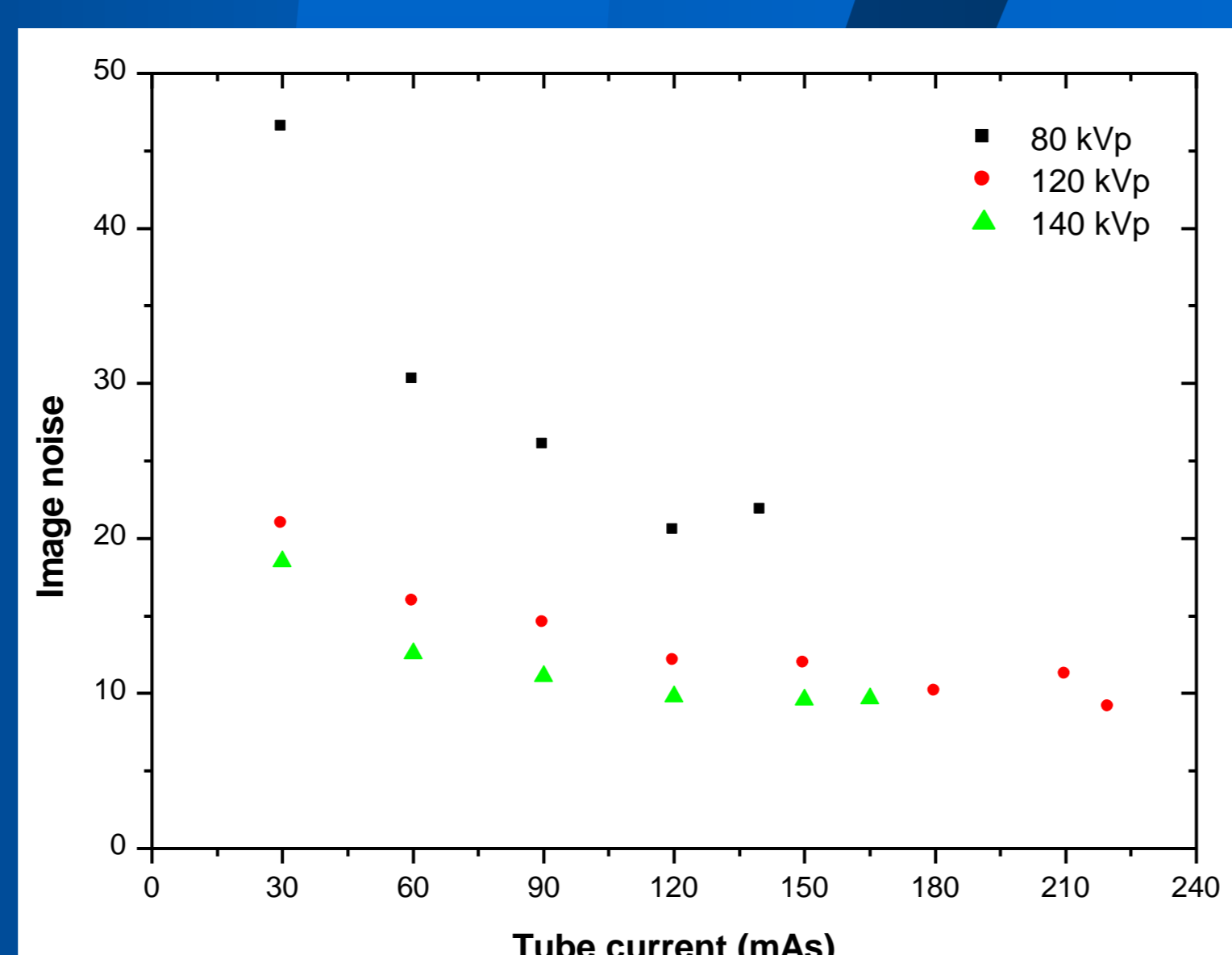
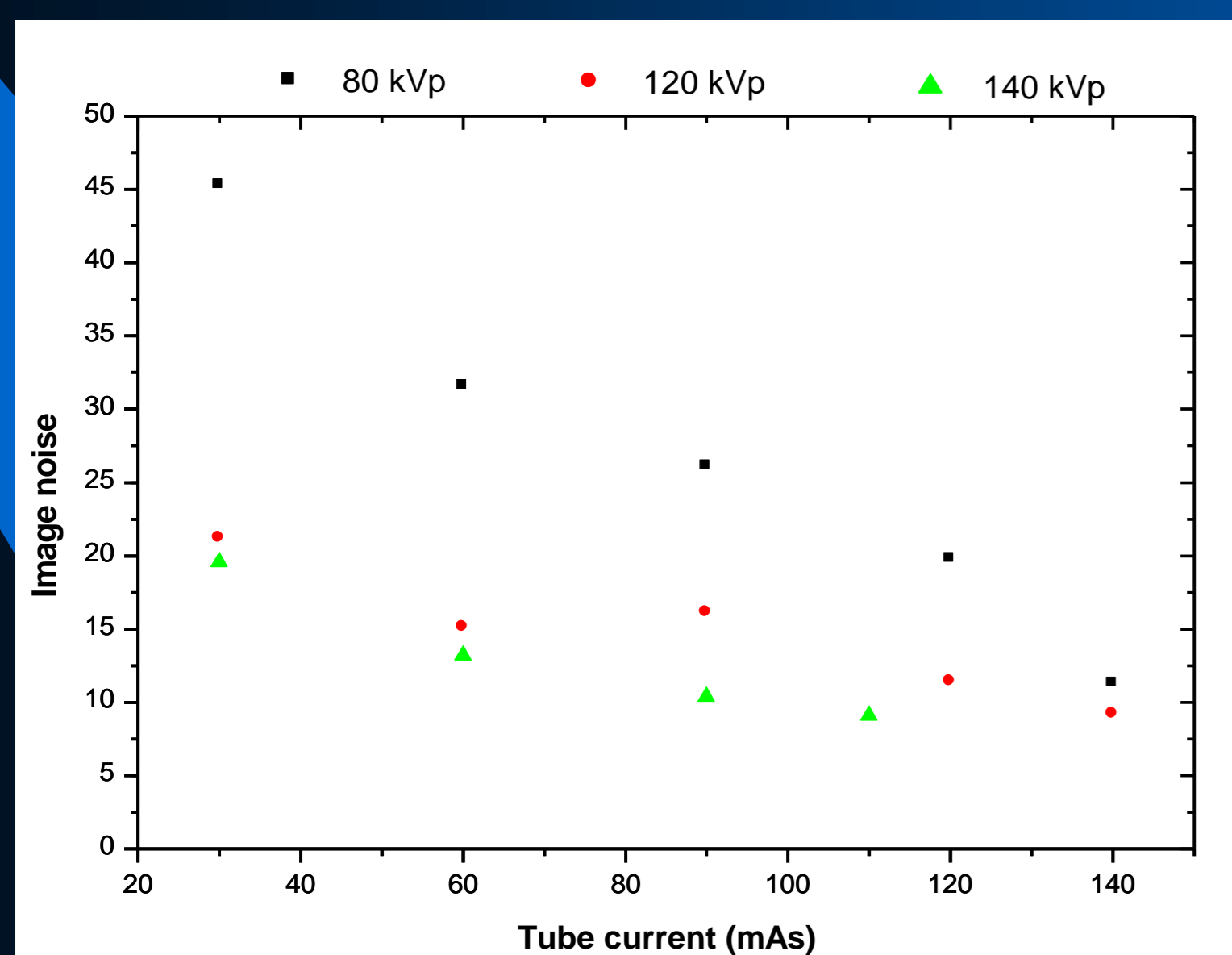
256-slice



3. Image noise:

64-slice

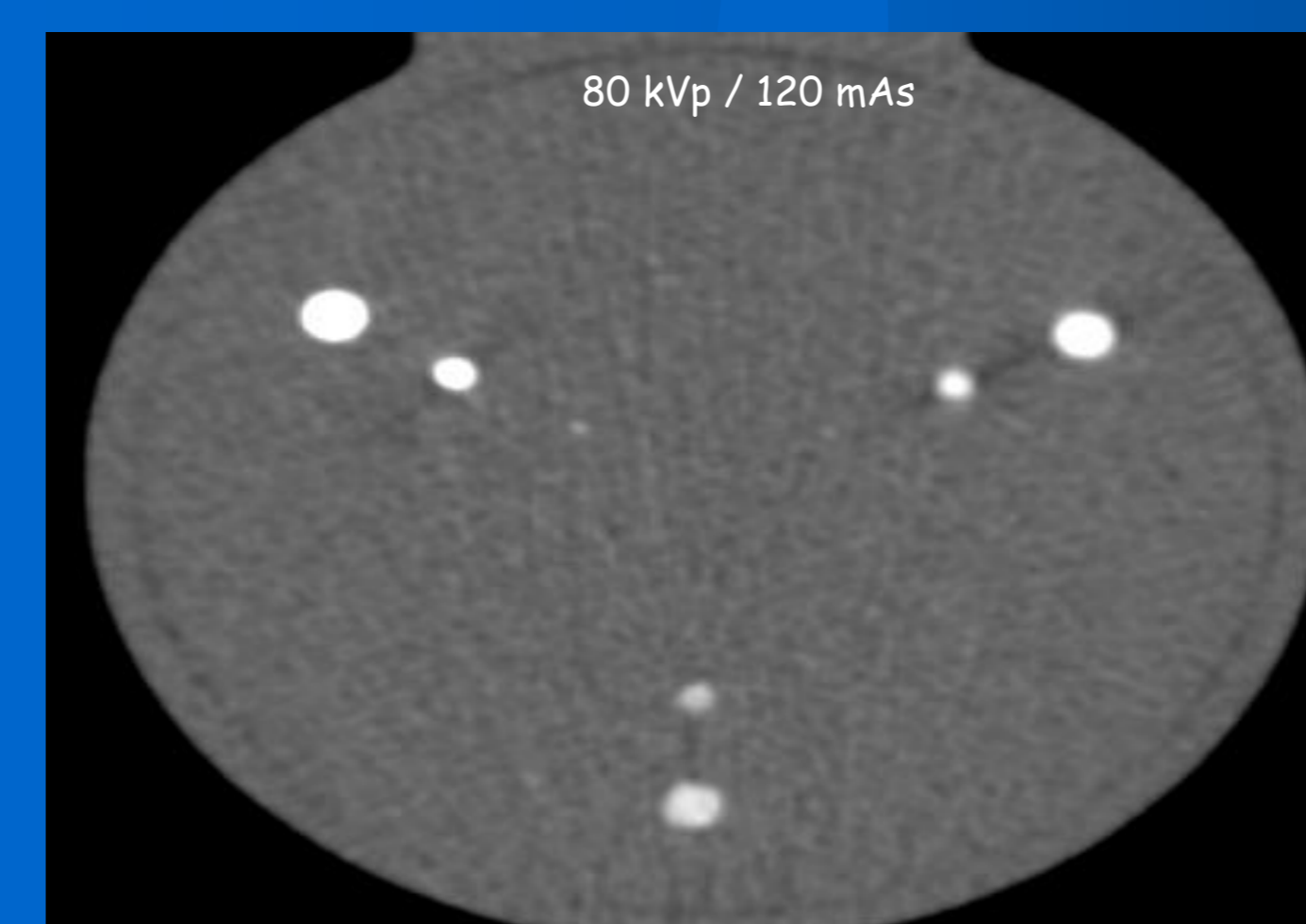
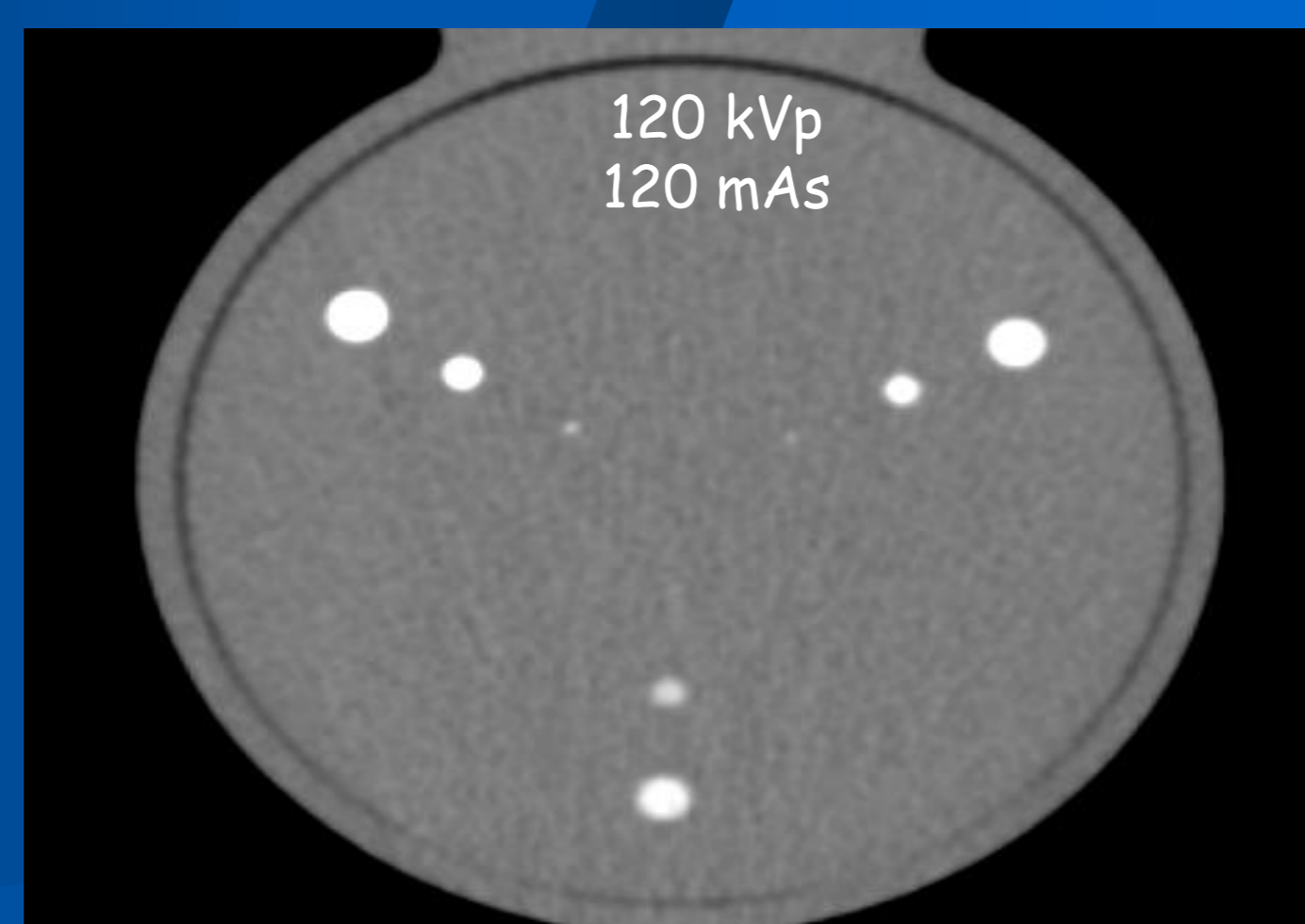
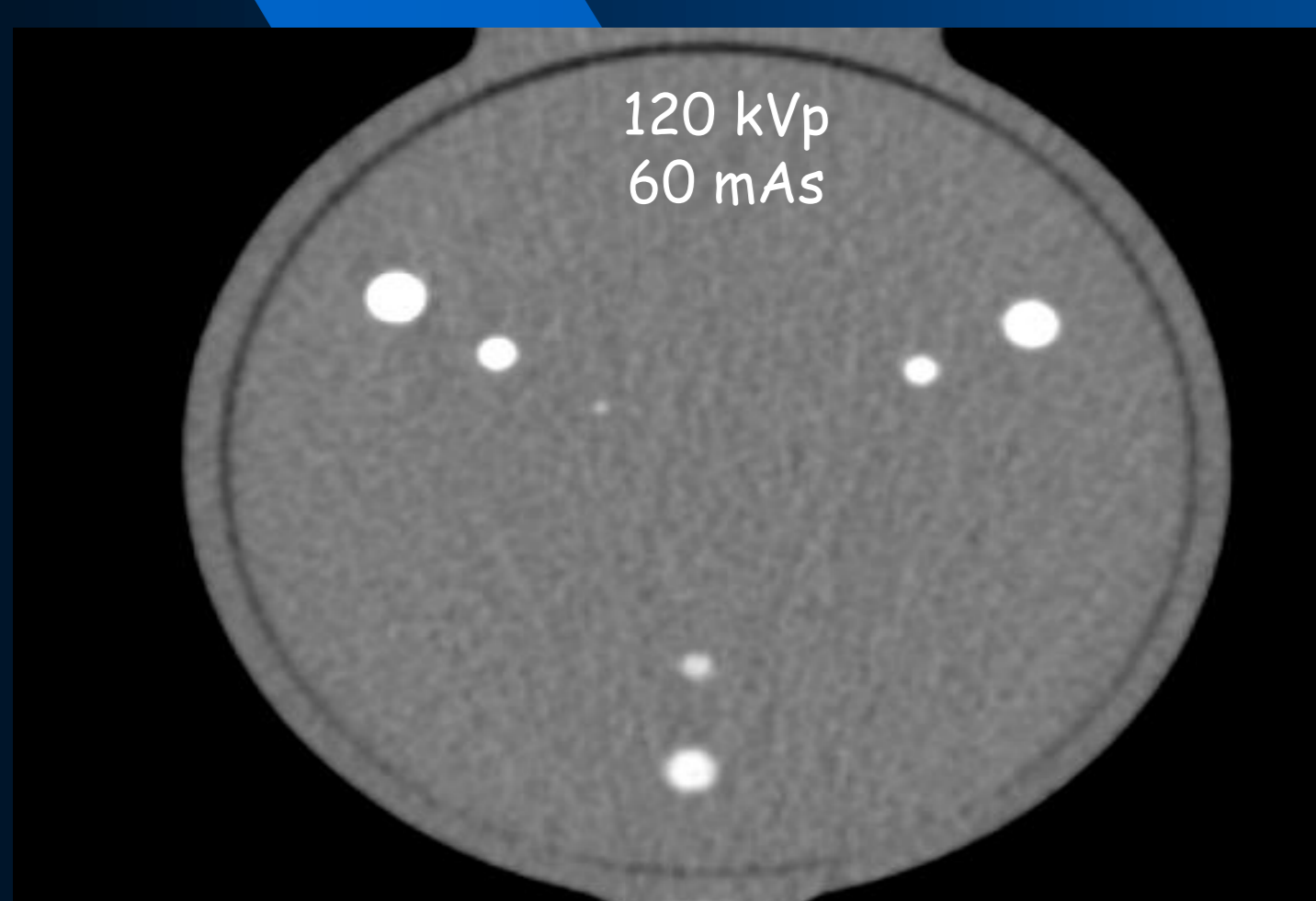
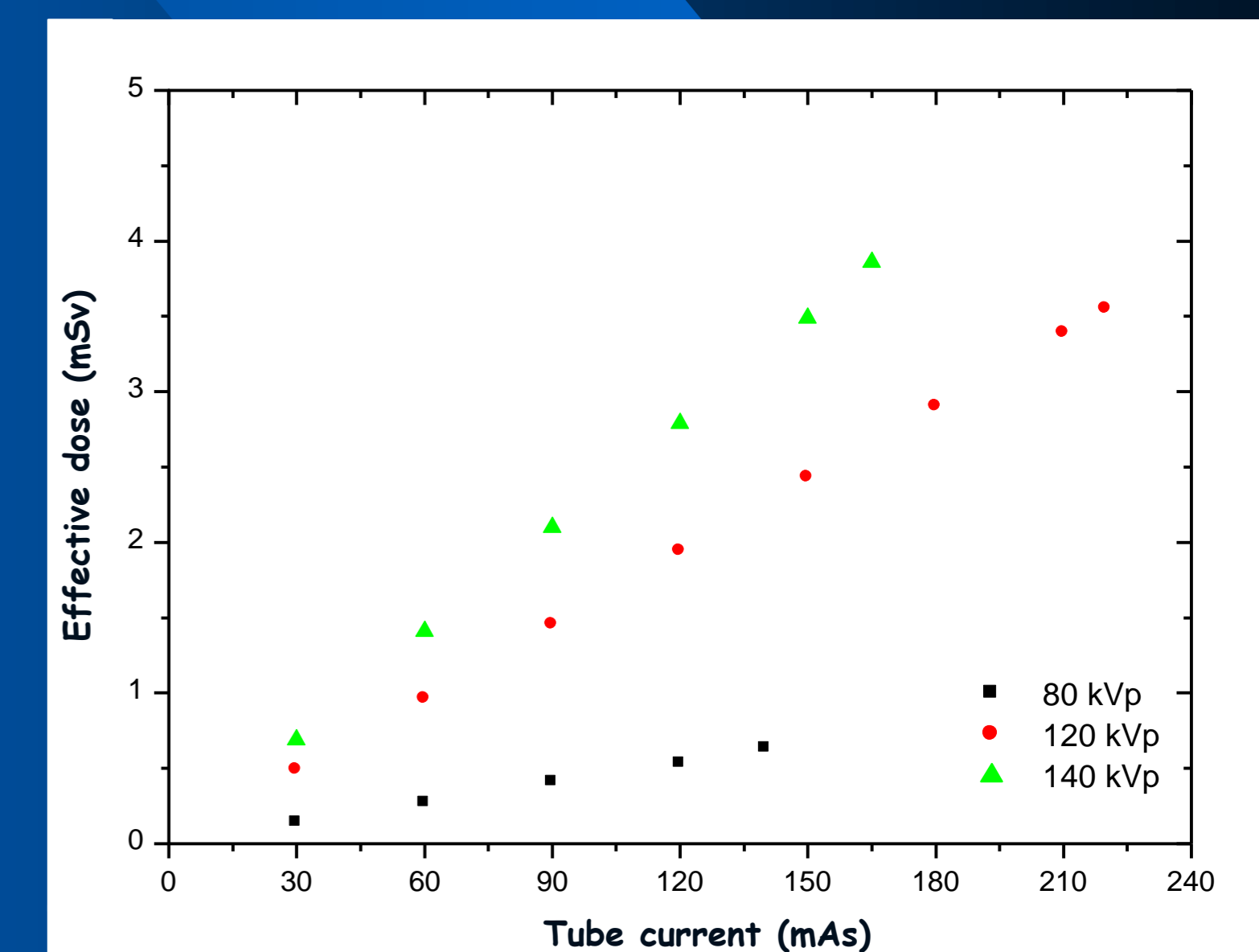
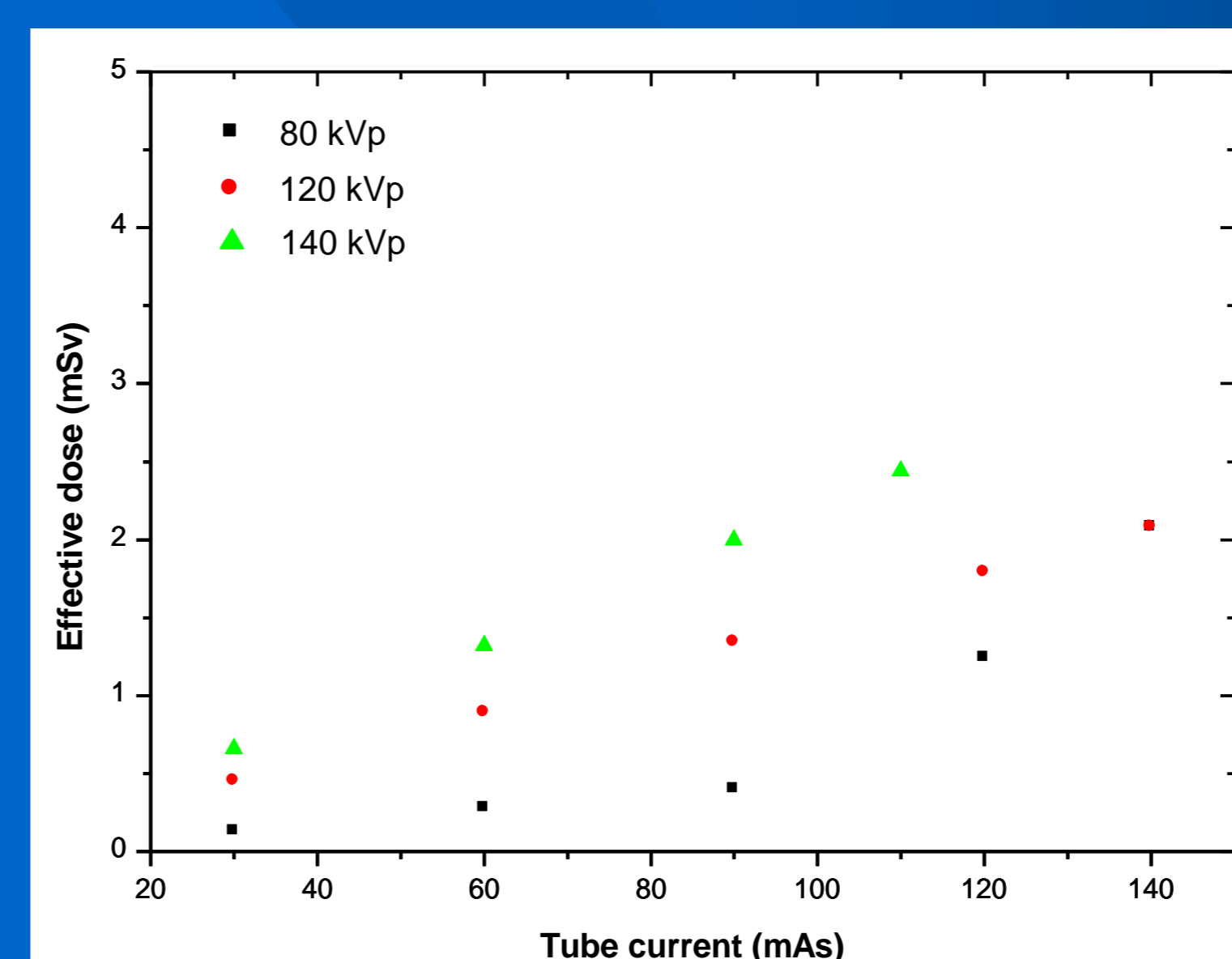
256-slice



4. Radiation Dose:

64-slice

256-slice



➔ 80 kVp: > calcium detection

CONCLUSIONS: Although noisier images was obtained with the mAs reduction, the diagnostic information was not compromised and the patient dose was reduced around 50%. This studied demonstrated the importance and viability of optimization procedures.

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