

# Dose optimization in computed tomography comparing automatic tube current modulation and fixed tube current techniques

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**“Dose optimization in computed tomography comparing automatic tube current modulation and fixed tube current techniques”**

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## INTRODUCTION

- High radiation doses received, especially in young patients, have a great importance with the known risk of **cancer development**
- *Computed Tomography* examinations corresponds to **70%** of all radiation doses in diagnostic imaging modalities.

# INTRODUCTION

A new technique to reduce tomography's radiation doses



**Automatic tube current modulation (ATCM)**

permits acquiring quality images with low radiation doses

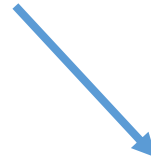
→ ATCM adjusts the mA according to patient's thickness

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# INTRODUCTION

Without an optimization process



**Low-quality images**  
that compromise the  
reliable medical  
diagnosis

Radiation doses  
questioning the  
ALARA principle

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## Purpose

The **purpose** of this study was to evaluate the radiation dose of fixed mA techniques and tube current modulation technique in CT the abdomen-pelvis protocol

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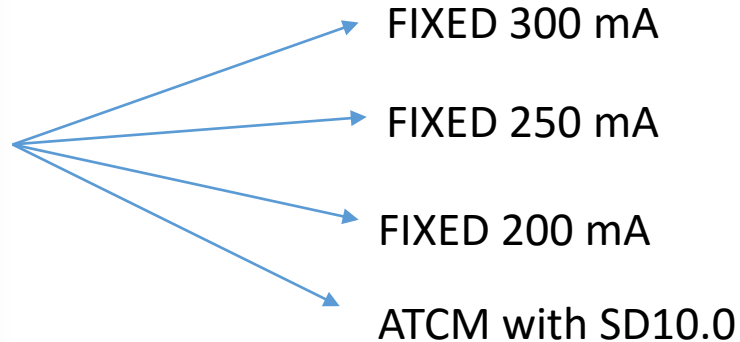
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# Methods

→ We used three fixed current protocols and one ATCM protocol



16-slice TOSHIBA

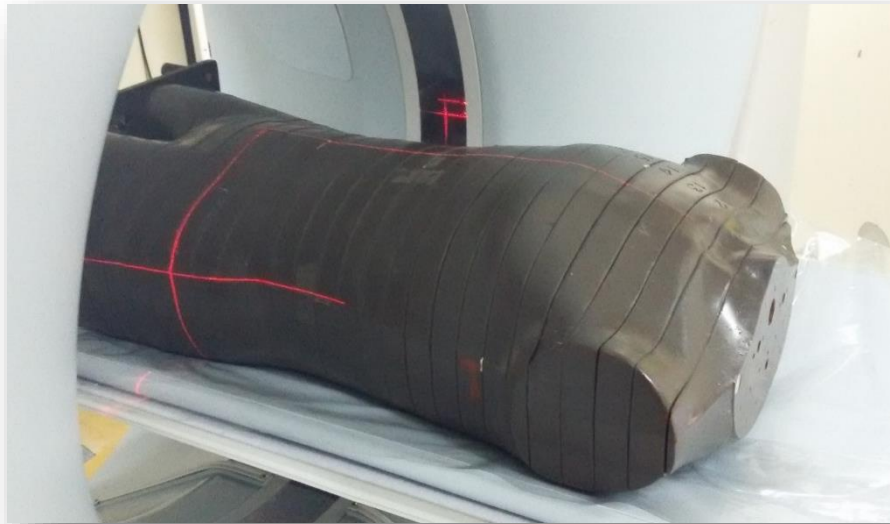


The CT protocol assess was the abdomen-pelvic

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# Methods



Protocols were applied in an anthropomorphic phantom (Alderson-Rando Phantom) for a dosimetric evaluation

Organ absorbed doses and effective doses were determined



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# Results

- 79,49%



	300 mA	250 mA	200 mA	SD10.0
Effective dose (mSv)	86,97	72,53	52,70	17,83
CTDI <sub>vol</sub> (mGy)	181,45	159,45	128,95	86,55
SSDE (mGy)	293,94	258,30	208,89	140,21
DLP (mGy.cm)	5086,20	4241,80	3082,40	1042,90
Noise (UH)	5,23	6,00	6,04	7,38

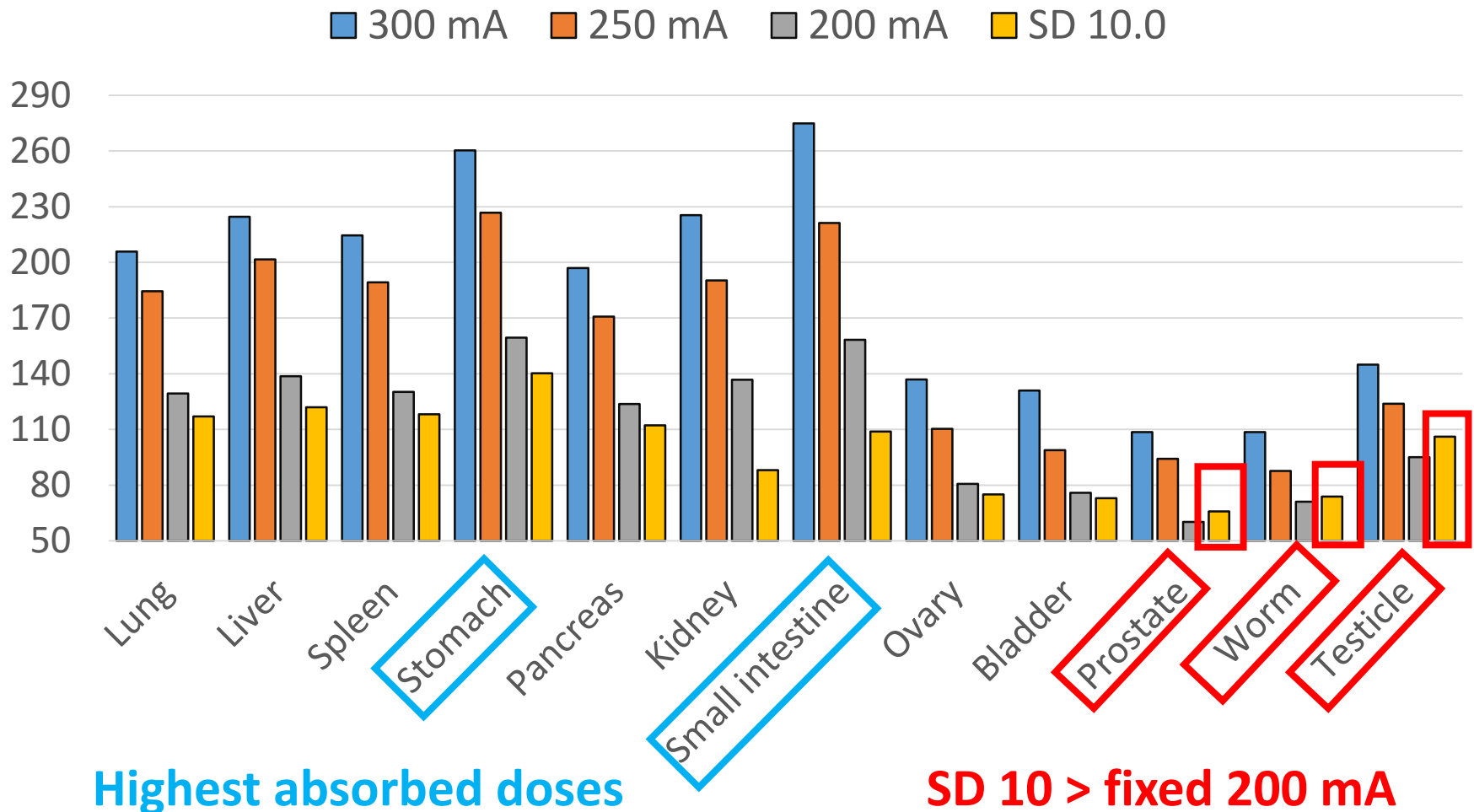
The larger E were found in the protocol with 300 mA. The difference to the protocol SD 10.0, which showed lower E, was of 79.49%.



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## Results



## Conclusion

- The **ATCM technique SD 10.0** has the lowest amount of *absorbed dose* and *Effective dose*
- ATCM protocols can be an **excellent alternative** to dose reduction in CT scans, since it does not impair the diagnostic image quality
- We observed that absorbed doses have three regions (Uterus, prostate and testicle) which modulated protocol were higher than the fixed protocol (200 mA)
- This behavior is mainly because this regions are in pelvis, a high density region