

Developments in first choice from conventional X-rays to CT for selected studies

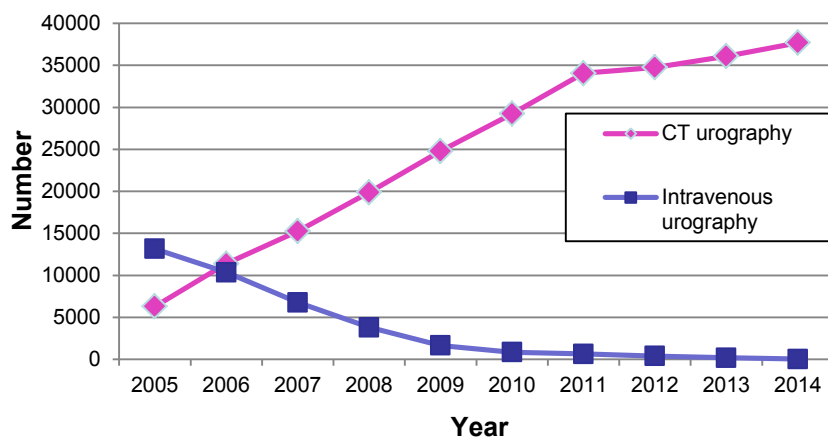
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1 Introduction

In the past 15 years extensive development within the field of CT has taken place. As a result, for some indications the first choice of examination method has changed from the conventional x-ray examination to CT examination. We will take a closer look at the practice changes within kidney and colon examination over the past 10 years. Number of examinations has been obtained from the Danish National Registry of Patients, covering x-ray examinations at public and private hospitals and clinics. Radiation doses have been collected nationwide in 2013-2014 for CT exams and in 2010-2012 for conventional examinations to enable setting of Diagnostic reference levels (DRLs).

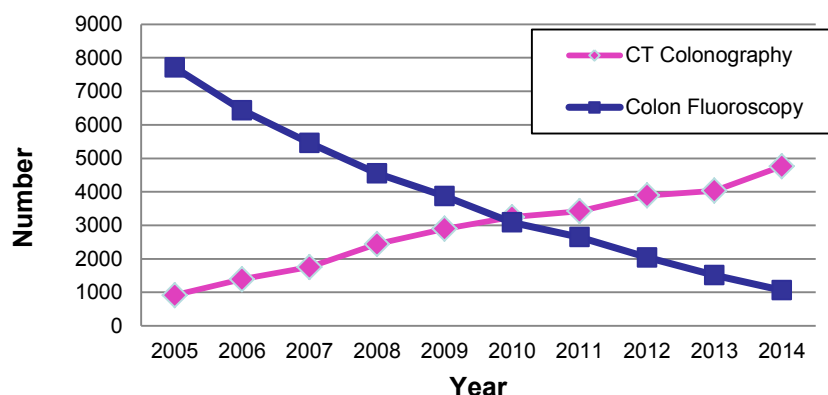
2 Urography

The total number of examinations has increased by about 90% in the period. Initial data suggests, that the typical effective dose for CT urography may be up 4 times as high as the typical effective dose for IV urography, depending on the indication for the examination. Data collection will continue in order to enable us to establish valid Danish diagnostic reference levels for CT urography.



3 Colon

The total number of examinations has decreased by 32% over the last 10 year period. The mean effective dose is around 70% higher for CT. The first choice for colon examination is a colonoscopy examination, an endoscopic examination not involving use of X-rays. If the colonoscopy does not provide sufficient diagnostic information, it will be supplemented with a CT scanning.



4 Conclusion

For both urography and colon examinations, a CT examination has become the first choice. By switching from the conventional X-ray examination to CT scanning, the dose to the patient is increased significantly. However, the CT scanning will provide more information, which may result in a faster diagnosis by avoiding the supplementary examinations. It is important that the CT examinations are justified and optimized. We will continue to follow the CT doses for these and other examinations, as a lot of work within dose optimization is being carried out both at the producer and locally at the hospitals.

Dose	DRL	Effective dose mSv
CT urography – stone	DLP 400 mGy·cm	6,8
CT urography - malignancy	DLP 930 mGy·cm	15,8
Intravenous urography	DAP 20 mGy·cm ²	4

Table 1: Danish DRLs for urography examinations; in terms of DLP for CT and DAP for conventional examinations, respectively. For CT, the DRLs are preliminary, due to lack of sufficient data. The last column shows corresponding effective doses calculated based on conversion factors.

Dose	DRL	Effective dose mSv
CT Colonography	DLP 710 mGy·cm	12,1
Colon Fluoroscopy	DAP 25 mGy·cm ²	7

Table 2: Danish DRLs for colon examinations; in terms of DLP for CT and DAP for conventional examinations, respectively. The last column shows corresponding effective doses calculated based on conversion factors.