# PROJECTED CANCER RISK FROM MEDICAL IONIZING RADIATION PROCEDURES IN DIALYZED PATIENTS

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## INTRODUCTION

Medical Procedures are associated with

increased Ionizing Radiation (IR) Exposure .

The evidence of an association between IRE and cancer risk is:
"Strong" for doses >100 mSv
"Good" for doses 50-100 mSv
"Reasonable" for doses 10-50 mSv.

The projected cancer risk due to IR can be estimated by the Effective and Organ Doses (ED, OD) and applying organ-specific cancer incidence or mortality data, as summarized in the Biological Effects of Ionizing Radiation (BEIR) VII report.

## AIMS

The aims of our retrospective study were to quantify the cumulative ED and OD to relevant organs and to assess the radiation risks of cancer in hemodialysis patients (HDP).

## PATIENTS AND METHODS

- 159 prevalent and incident HDP between 30.06.2007 to 31.12.2012, with follow up >1year (486 patient-years);
- aged 65.3 15.9 years;
- without previous or current diagnosis of neoplasia;

The number and type of radiological procedures and CED and OD were collected and estimated from the Radiology Information System of our Institution.

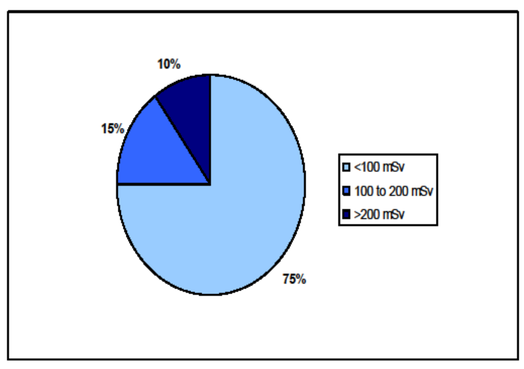
Radiation risk, defined as Risk of Exposure-Induced Death (REID %) was estimated according to the BEIR VII

## RESULTS

Mean (median) total CED: 84 (36) mSv/pts;

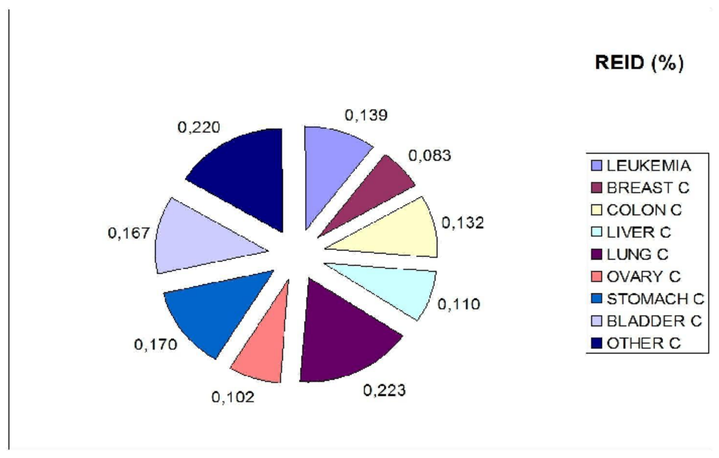
Mean (median) annual CED: 28 (12) mSv/pts/y

| Procedure | Number of procedures N (%) | Annual CED (mSv/pts/y) mean SD | Total CED mSv (%) |
|---|---|---|---|
| Overall total | 2163 (100%) | 28.1 44 | 13393 (100%) |
| Conventional radiology | 1555 (71.9%) | 1.9 1.5 | 835.3 (6.2%) |
| Computed Tomography | 344 (15.9%) | 23.1 42.5 | 11054 (82.5%) |
| Nuclear Medicine | 130 (6%) | 1.2 2.2 | 504 (3.8%) |
| Interventional | 134 (6.4%) | 2.0 4.4 | 1000 (7.5%) |




| Mean cumulative Organ dose mSv | |
|---|---|
| Kidney | 103 |
| Lung | 102 |
| Stomach | 100 |
| Liver | 99 |
| Colon | 77 |
| Bone Marrow | 58 |

| Patient characteristics | Total N (%) | YES | NO | p value |
|---|---|---|---|---|
| | | REID (%) (mean sd) | | |
| | 159 | 0.99 1.14 | | |
| Male Sex | 101 (63.5%) | 0.97 1.24 | 1.03 0.95 | 0.17 |
| Diabetes mellitus | 52 (32.7%) | 0.63 0.89 | 1.16 1.21 | 0.05 |
| Ischemic heart disease | 61 (38.3%) | 0.74 0.83 | 1.14 1.28 | 0.53 |
| Kidney Transplant eligible | 51 (32.1%) | 1.49 1.33 | 0.76 0.97 | 0.003 |
| Kidney Transplant | 13 (8.2 %) | 0.92 0.96 | 1.00 1.16 | 0.91 |
| Death | 53(33.3%) | 1.16 1.17 | 0.91 1.13 | 0.09 |




Mean (median) REID: 0.99 (0.45)%;

Maximum REID: 4.46%.

Young age and being on transplantation waiting list are correlated with a significantly higher REID.

## CONCLUSIONS

- HDP receive high CED and OD from medical imaging.
- The excess cancer risk attributable to IRE is not negligible (about 1% in a few years)
- Particular attention should be paid to young patients and patients who will undergo kidney transplantation


DOI: 10.3252/pso.eu.51era.2014
Poster presented at: 51 ERA-EDTA CONGRESS AMSTERDAM THE NETHERLANDS MAY31-JUNE3 2014