PROJECTED CANCER RISK FROM MEDICAL IONIZING RADIATION PROCEDURES IN KIDNEY TRANSPLANTED PATIENTS

De Mauri A[1,4], Matheoud R[2], Izzo C[1], Brustia M[1], David P[1], Conte MM[1], Cantaluppi V[3,4] , Brambilla M[2], Chiarinotti D[1].

1 Nephrology Department, 2 Medical Physics Department, 3 Kidney Transplant Unit, University Hospital "Maggiore della Carità", Novara, Italy, 4 Department of Health Sciences, Amedeo Avogadro University of Eastern Piedmont, Novara, Italy

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.

Kidney Transplanted Patients (KTP) have higher risk of cancer because of drug related immunosuppression.

The projected cancer risk due to IR is estimated by the Effective and Organ Doses (ED, OD) and organ-specific cancer incidence/mortality, as described 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 kidney transplanted patients.

PATIENTS AND METHODS

- 102 prevalent and incident KDP between 30.06.2007 to 31.12.2013, with follow up >1year (550 patient-years);
- aged 53±14 years; 69 males
- without previous 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.

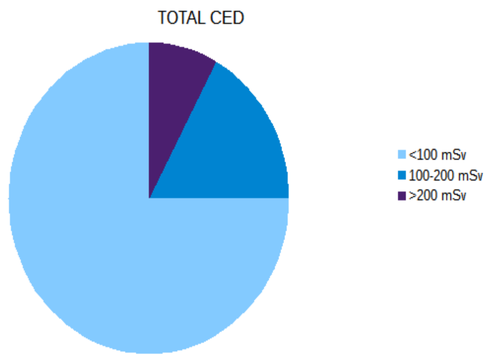
Radiation risk, defined as Risk of Exposure-Induced Death (REID %), was estimated according to the BEIR VII

OD and REID not performed on the of 31 patients that only had conventional x-rays (arbitrarily set to zero).

RESULTS

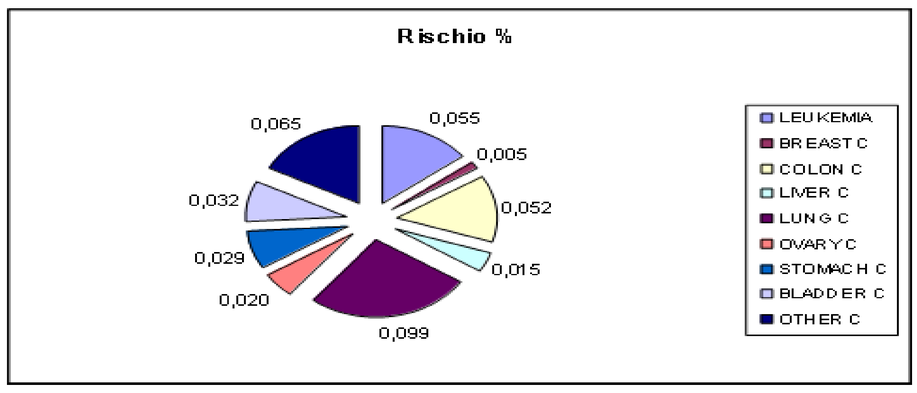
Mean (median) total CED: 75±120 (29) mSv/pts; Mean (median) annual CED: 19 ±40 (5.6) mSv/pts/y

Procedure	Number of procedures N (%)	Annual CED (mSv/pts/y) mean ± SD	Annual CED (mSv/pts/y) Median (IQR)	Total CED mSv (%)
Overall total	2980(100%)	20.4±41.4	5.8 (2.4-20.9)	8194(100%)
Conventional radiology	2641(88.6%)	3.4±4.7	2.4 (1.8-3.4)	1490 (18.3%)
Computed Tomography	259 (8.7%)	16.1±37.1	2.5 (0-16.9)	6371 (77.7%)
Nuclear Medicine	72 (2.4%)	0.8±1.9	0 (0-1)	274(3.3%)
Interventional	8 (0.3%)	0.2±0.7	0	59 (0.7%)



Organ	Mean cumulative OD mSv
Kidney	151
Bladder	140
Stomach	137
Liver	134
Uterus/ovarius	134
Colon	129

Patient characteristics	Total N (%)	YES	NO	p value
		REID (%) (mean±sd)		
	71	0.25±0.46		
Male Sex	46 (64.8%)	0.34±0.58	0.38±0.37	0.15
Diabetes mellitus	14 (19.7%)	0.27±0.23	0.37±0.56	0.95
Ischemic heart disease	14 (19.7%)	0.48±0.73	0.33±0.45	0.91



Mean REID: 0.25±0.46%; Median 0.5% 4% of KTP had REID > 1%.

CONCLUSIONS

- KTP receive high CED and OD from medical imaging.
- The excess cancer risk attributable to Ionizing radiation exposure is not negligible (about 0.5% in a few years)
- This should be of concern for nephrologists since KTP are living longer and have several concomitant risk factors for future cancer, including immunodepressive status.

DOI: 10.3252/pso.eu.54ERA.2017