How we manage radiation protection in our country
Cyprus Radiological Society

A review of computerised tomography utilisation in Cyprus

Yiannakkaras C.[1], Christofides S.[2], Kaolis D.[1], Chrysanthou I.[1], Kokona G.[1], Tziakouri C.[3]
[1] Cyprus Association of Medical Physics and Biomedical Engineering, P.O. Box 24039, 1700, Nicosia, Cyprus; [2] Biomedical Research Foundation, P.O. Box 24039, 1700, Nicosia, Cyprus;
[3] Cyprus Radiological Society, Nicosia, Cyprus
Contact: Yiannakkaras C.; call4charis@gmail.com

Abstract

Internationally, paediatric CT attracts a lot of research interest in relation to radiation protection. Paediatric CT cohort studies are widely considered to be a very promising tool in the effort to assess the impact of exposure lower than 100 mSv. This poster reports on an attempt to examine paediatric and adult CT utilisation in Cyprus.

Introduction

Internationally, paediatric CT attracts a lot of research interest in relation to radiation protection. Table 1. summarises the cohort studies on paediatric CT examinations currently underway around the world [1]. In order to share this interest, it was decided to assess the extent of the CT utilisation in Cyprus with a particular emphasis on the justification of paediatric CT examinations and their patient doses.

Table 1: Ongoing cohort studies on paediatric CT from around the world. (Adapted from: Einstein, A.J., www.thelancet.com, Vol. 380, August 4, 2012).

Study	Size of exposed cohort	Age at exposure (years)	Start Date of accrual	Estimated report date
Belgium	30 000	0-15	2002	2016
Denmark	30 000	0-18	2000	2016
France	90 000	0-5*	2000	2016
Germany	140 000	0-15	1985	2016
The Netherlands	40 000	0-18	1998	2016
Norway	20 000	0-20	2005	2016
Spain	200 000	0-20	2005	2016
Sweden	95 000	0-18	1984	2016
UK	400 000†	0-21	1985	2012‡
EPI-CT (pooled European)	1045 000§	0-21	1984-2005	2016
Australia	660 000	0-19	1985	2012-13
Ontario, Canada	370 000	0-17	1985	2013
Ontario, Canada	4105 000	≥ 18	1991	2013
Israel	42 000	0-22	1985	2013
Israel	18 000	0-22	1999	2013

† Including the extended cohort
§ Estimated size. EPI-CT International pediatric CT scan study. http://epi-ct.iarc.fr/index.php (accessed May 29, 2012)
* 0-10 years from 2007
‡ Pearce MS, Salotti JA, Little MP, et al. Radiation exposure from CT scans inchildhood and subsequent risk of leukaemia and brain tumours: a retrospective cohort study. Lancet 2012; published online June 7. DOI:10.1016/S0140-6736(12)60815-0.

Methodology

In Cyprus there is one gynaecology-obstetrics and paediatric hospital operating in the public sector. This hospital is not equipped with a CT unit. Therefore, paediatric CT scans are performed in all the other hospitals of the public as well as the private sector. An attempt was made to exploit all possible sources of available published information with regard to the paediatric (and adult) CT usage in Cyprus. This included publications in peer-reviewed scientific journals and official government publications. The bibliographic search did not produce any scientific journal publications and the official government publications were limited to the government's annual public hospital statistics.

Results

Our search has not succeeded in producing results as regards the paediatric CT usage in Cyprus. Hence, our results and estimates relate to general (paediatric + adult) CT usage, based on the available officially published data. The number of CT examinations performed by the country's public hospitals (Figure 1), which operate five CT units, roughly tripled between the years 2000 to 2010 [2]. It was not possible to obtain official information as regards the number of CT examinations performed by the CT units (more than 20) operating in the private sector.

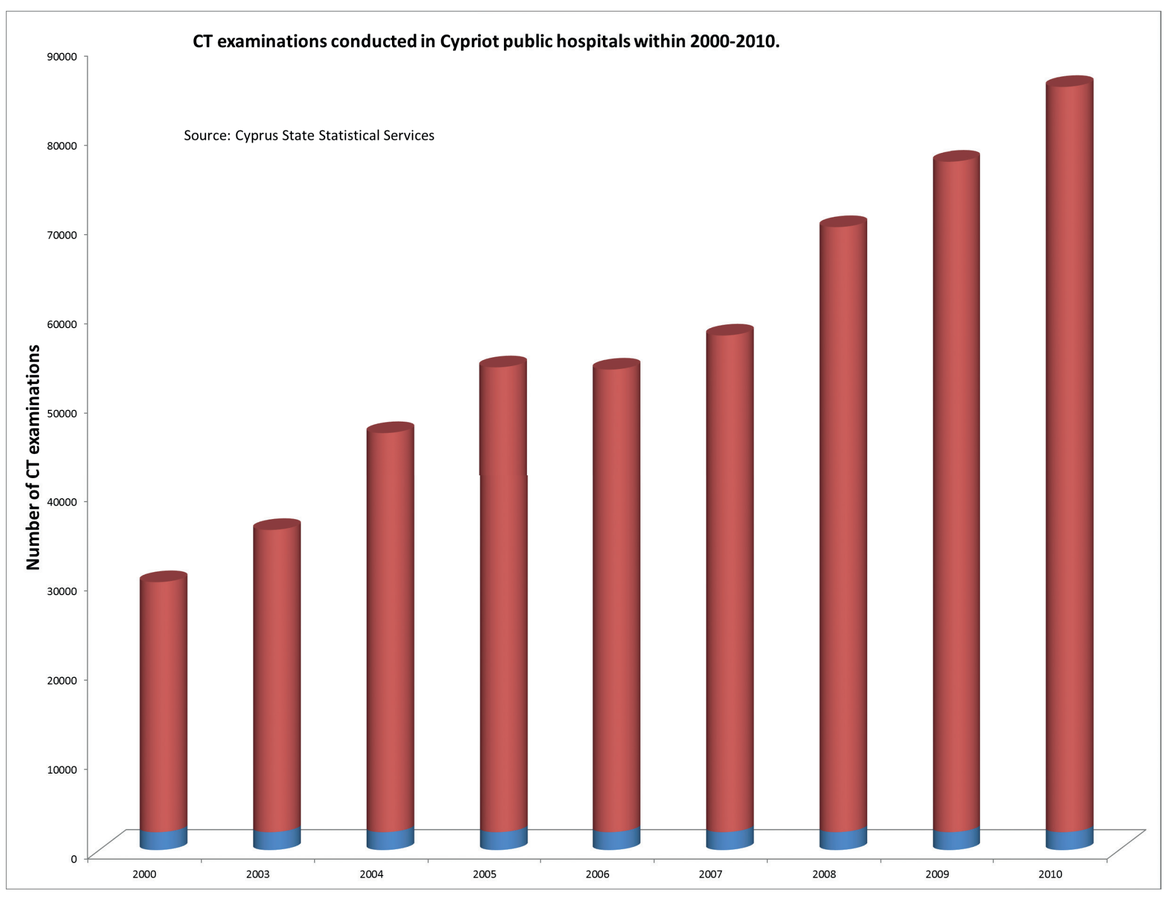

Figure 1: CT examinations from Cyprus public hospitals during 2000-2010.

The position of Cyprus in the OECD list [3], for the number of CT examinations performed in 2009, based on the available information from the public sector (i.e. 75,157 CT examinations), is shown in figure 2 (a). Based on an assumption that the private sector performs 4-5 exams per day per unit (which equals 50% of the CT examinations as in the public sector), Cyprus totals approximately 110,000 CT examinations for a population of 0.8 million [4]. As such, the country would find itself in the leading group of countries in this OECD list with approximately 137 CT examinations per 1,000 population, shown in figure 2 (b).

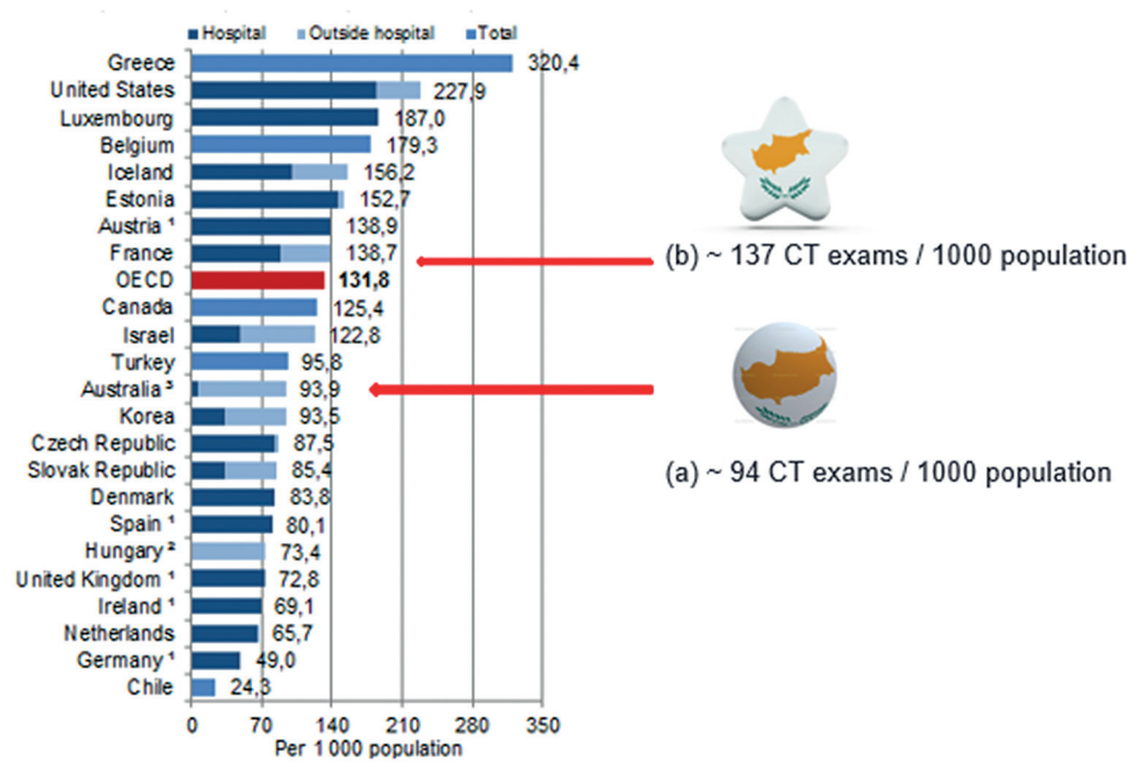

Figure 2: Cyprus' ranking within the OECD list of countries in terms of number of CT examinations per 1000 population for 2009 or the nearest year, (a) for public hospitals alone based on official statistics and (b) for public and private hospitals together based on the assumption that the workload for the private sector is roughly 50% of that of the public sector.

Furthermore, it was not possible to obtain any official information relating to the age distribution of patients examined with computerised tomography in Cyprus.

Conclusions

Based on the available data and our assumptions, Cyprus is one of the countries in the upper third of the 2009 list for the number of CT examinations performed in one year per 1,000 population.

The lack of information relative to the age distribution of patients undergoing CT exams, both in public and private sector healthcare, hinders the effort to reach more specific conclusions about paediatric CT examinations performed in the country.

The lack of official data concerning radiological examinations in the private sector does not allow for a complete statistical analysis on a national basis.

All the aforementioned issues are of great concern, and should receive special attention from all parties involved in patient care and protection. In particular, a uniform policy for the management of radiological examination records should be adopted across both the public and private sectors. The issues of justification and quality of medical x-ray examination records and statistics in Cyprus should also be revisited.

Poster References:

Einstein A J, "Beyond the bombs: cancer risk of low dose medical radiation", www.thelancet.com, vol. 380, August 4, 2012.

Cyprus State Statistical Services, "Health and Hospital Statistics 2010", Health Statistics, Series I, Report No. 31, Printing Office of the Republic of Cyprus

OECD (2011), Health at a Glance 2011: OECD Indicators, OECD Publishing. http://dx.doi.org/10.1787/health_glance-2011-en.

Cyprus population in 2009 from Index Mundi (http://www.indexmundi.com/cyprus/population.html) as accessed on December 16, 2013.