

Patient's Awareness of Cancer Risk from Radiation in Computerized Tomography

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الخلاصة:

يزداد فحص المرضى بالمفهراس استخداما وانتشارا يوما بعد يوم وتزداد مع ذلك خطورة اصابتهم بالاصابة بالسرطان مستقبلا. **تهدف** الدراسة الى تقييم مدى ادراك المرضى لخطر الإصابة بالسرطان جراء تعرضهم لكمية عالية من الإشعاع من فحصهم بالمفهراس وكذلك تقييم مستوى ابلاغ هؤلاء المرضى بهذى الخطر من قبل الكادر الطبي. الدراسة عبارة عن استبيان شمل ١٠٠ مريض تم احالتهم لفحص المفهراس. النتائج: غالبية (٨٦%) المرضى لم تكن لديهم معرفة بان المفهراس يعرض المريض لكمية عالية من الاشعاع مما يزيد من خطورة اصابتهم بالسرطان. ثلاث وستون مريضا (٦٣%) لم يتم اخبارهم بذلك الخطر لا من قبل الطبيب المرسل ولا طبيب الاشعة ولا التقني الفاحص. **تستنتج** الدراسة ان هناك قصور في معرفة وادراك المرضى لكمية الاشعاع وازدياد خطر الإصابة بالسرطان جراء فحصهم بالمفهراس واكثر المرضى لا يتم اخبارهم وإعلامهم بذلك قبل الفحص. تؤكد الدراسة على أخذ موضوع خطر الاشعاع بجدية و اتخاذ إجراءات عاجلة والقيام ببرامج توعية لتثقيف المرضى وإنشاء نظام اعلامي (اخباري) للمرضى قبل فحصهم. كما توصي باجراء دراسات اكبر لتقييم المستوى الحقيقي لمعرفة وادراك خطر الاشعاع ليس عند المرضى فحسب بل لدى الكادر الطبي ايضا.

Abstract

The widespread and rapidly increasing use of computerize tomography (CT) has raised the burden of radiation to patients with consequent raise of risk of radiation-induced cancer. **Objective:** to assess patient's awareness of the risk of cancer from CT radiation and the level of patient's informing. **Methods:** A questionnaire was administrated to 100 patients (55 female, 45 male) who were referred to CT unit. **Results:** Majority of patients (86%) have no awareness of the high radiation implied by CT examinations and the increased risk of cancer. Sixty three (63%) of referred patients had not been informed about risk neither by referring physician, radiologist nor by the CT technologist, however 40 of them (63.5%) would accept examination, 15 (23%) would refuse it and 8 (12.7%) would hesitate if they had been told about that risk. **Conclusion:** There is great deficiency in the patient's knowledge of the risk from CT radiation and majority are not informed by medical personnel. Urgent actions and programs, specially implicating media, to reasonably educate patient about these issues seems necessary. Further larger-sample studies to assess awareness of patients as well as medical staff are recommended.

Introduction

Adverse effects of radiation on human particularly increased risk of cancer are well documented whether from natural or man made sources ^(1, 2, 3, and 4)

Diagnostic medical exposure is the major source of man-made radiation exposure of the population and add about one sixth to the population dose from background radiation. ⁽⁵⁾ By their nature, CT examinations contribute disproportionately to the collective diagnostic radiation dose to the population and in Britain, approximately 4% of diagnostic radiology procedures are CT examinations, but their contribution to the collective dose is approximately 40% ⁽⁶⁾ & in United States, CT accounts for just 13%

of all diagnostic radiology procedures but is estimated to be responsible for more than 70% of the collective radiation dose delivered to patients ^(7,8)

The use of CT has increased rapidly in the past decades ^(9, 10) and become more available therefore increasing medical radiation burden & there were an estimated 72 million CT scans conducted in 2007 alone in the United States ⁽¹¹⁾.

World-wide authorities had emphasized on the life-time risk of human cancer risk associated with CT examinations and, for example, in United Kingdom an estimated 100-250 deaths occur each year from cancers directly related to medical exposure to radiation ⁽¹²⁾, while recent study in 2009 ⁽¹¹⁾, estimated that approximately 29,000 future cancers could be related to the number of CT scans performed in 2007. In particular, frequently scanned patients accrue large cumulative radiation doses and increased levels of risk ⁽¹³⁾.

Because the patient is the core in this issue of serious estimated risk of CT radiation, awareness for this risk is necessary. However, while a several published surveys assessing awareness in both patients & physicians were done in other countries and the growing worldwide concern, no clear data are available in our region about the current knowledge level of our patients regarding CT risk nor type or extent or informing by radiologists or requesting physicians.

Objectives

- 1- Evaluate the awareness of huge radiation implied by CT and possible risk of cancer .
- 2- Assess the level of patient's informing and their responses if they were informed about that risk.

Patients and methods

Cross-sectional observational study was done on 100 patients (55 female, 45 male,) referred to CT unit in al-Hakeem General Hospital. A questionnaire was orally administered to randomly selected patients with exclusion of very old aged, seriously ill patients and those referred as emergency cases. In addition to general data (like age, sex, type of examination & specialty of the referring doctor), the questionnaire contained questions concerning patient's awareness of cancer risk of radiation and the high radiation implied by CT compared to other radiographic procedures and whether or not the patient had been informed about the possible risk of cancer. If yes, by whom, the referring doctor, radiologist and/or CT technician. Last question was that if the patient was informed, what he/she would act; accept the procedure, refuse it or hesitate.

Answers were taken directly from the patient if he/she was adult, but from one or both parents if the patient was child.

Results

One hundred patients were included in the study, 55 (55%) were female and 45 (45%) male with mean age of 29.6 years (S.D. +/- 15.8).

Examination was mostly commonly requested for head (72%), followed by abdomen/pelvis (11%), chest (10%) & limbs (7%).

Majority (82%) of patients have no any awareness about the high radiation dose implied to the patient by CT, while only 18% (18 patients) have adequate awareness, of these 18, 2\3 were females & 1\3 males (12 vs. 6). Table-1-

Table- 1- Patient's awareness of CT radiation risk with sex distribution.

	Have awareness	Have no awareness	Total
Male	6 *(33.3%)	39 (47.6%)	45
Female	12 (66.7%)	43 (52.4%)	55
Total	18	82	100

*Percentages are fractions of the total of each column.

About 2\3 of patients (63, 63%) had not been informed about risk from CT radiation neither by referring physician, radiologist nor the operator in CT unit.

Of the 37 patients who were informed, 29 informed by technologist, 6 by referring doctor & 2 by the radiologist.

Of those 63 non-informed patients, their responses if they had been informed were that 40 (63.5%) would accept, 15 (23.8%) refuse and 8 (12.7%) were hesitating and would think more & consult before deciding. (Figure-1).

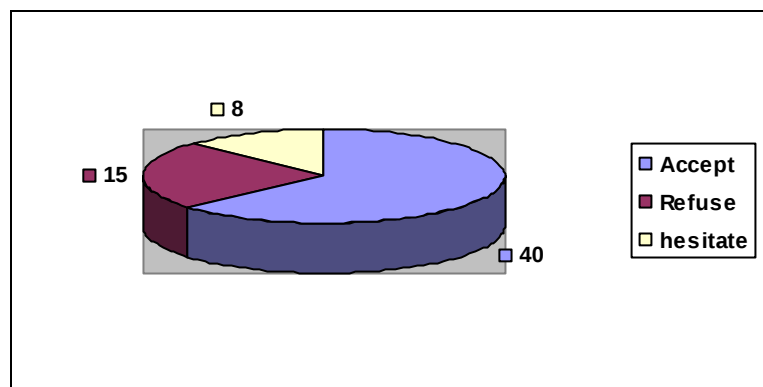


Figure 1- Responses of no informed patients if they had been informed.

In most patients (93, 93%), the current CT examination was requested for the first time while 2nd time in 5 patients (5%), 3rd in tow patient (2%) and 4th time in one patient (1%) and the level of awareness and informing can be seen in table -2-

Table-2- Informed and non-informed patients according to the order of the requested current CT scan

Order of current CT scan	Informed	Not informed	Total
1 st	34 *(36.6%)	59 (63.4%)	93
2 nd	2 (40%)	3 (60%)	5
3 rd	0 (0%)	1 (100%)	1
4 th	1 (100%)	0 (0%)	1
Total	37	63	100

*Percentages are fractions of the total of each row.

As shown in figure -2-, most frequent referring specialty was general medicine but higher ratios of non-informed to informed patients were from neuromedicine (9 : 5) & general surgery (8 : 3) while all patients from ophthalmology (single patient) & neurosurgery (two patients) were not informed.

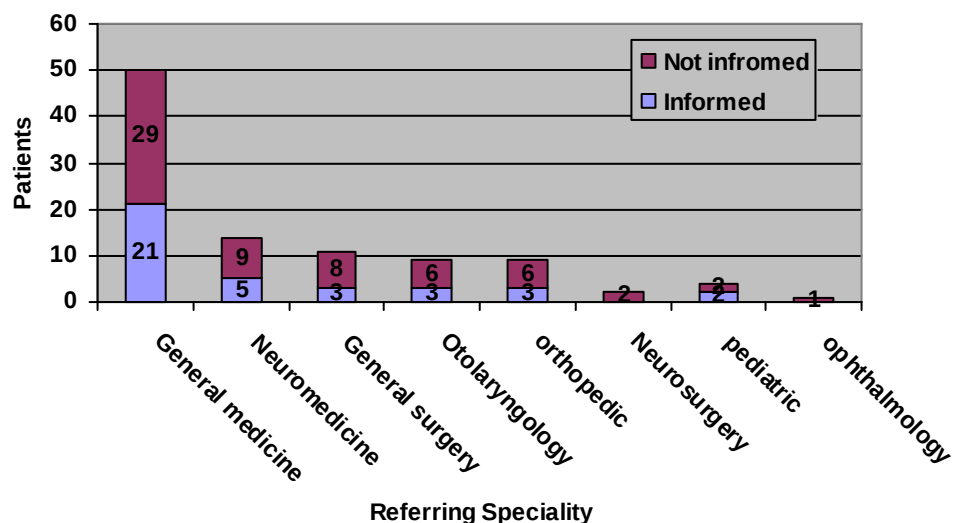


Figure -2-Distribution of non-informed patients according to the specialty of referring physician.

Discussion

Despite of the recent growing concern of CT radiation-induced cancer & statistically significant high estimated lifetime risk particularly in children and repeated scans ^(11, 13, 14), only 18 (18%) of patients included in our study were aware that CT implies high radiation than other common radiographic procedures (table -1-).

This observation reflects the level of underestimation of patients to the risk from CT as had been seen in Lee et al study in 2004 ⁽¹⁵⁾ and supports the findings of other studies ^(16, 17 and 18) which found that most people overestimate the risk of industrial radiation and underestimate the risk of medical radiation application.

Interestingly, female appeared to be more aware of CT radiation risk than male by two-fold (12 versus 6) (table 1) possibly reflecting more women's care and attention on health issues than men.

While many studies emphasized on close collaboration between radiology personnel and both referring physician and patients, with informed discussion as essential step in optimizing use of CT, (19, 20, 21) we found that about 2/3 of patients (63%) were not given information about the risks and radiation dose from CT scan, a finding consolidated a study showed (22) that only minority of institutions inform patients about possible radiation risk and goes with recent Karsli T et al (23) in 2009 that most physicians do not know if patients are informed about cancer risk from radiation-based imaging.

Radiology technologists are more likely to inform patients about CT and associated risks than their physician (22). Similarly, this study also founded that 78.3% of informed patients (29 of 37) were informed by technologist possibly because they have closer contact with the referred patient and more time to explain the procedure and its risk.

Regarding the response of non-informed patients (63 patients), 15 patients (23.8%) would refuse the examination and 8 (12.7%) would hesitate if they were had been informed about risk and benefits of radiation from the scan (Figure-1). This might indicate that informing will affect patient's view toward CT and the decision of acceptance of the scan, and the patient should be supplied by adequate information and then given the right to accept or not.

However informing have to be reasonable, logical and shared by the all three elements (referring physician, radiologist & technologist), (20, 24) the 40 patients who still accept CT scan after informing in this study is another evidence that proper and reasonable informing will not lead to unnecessary fear or panic phenomenon from CT as long as the health care providers themselves are aware of the issue, and the ordering clinicians should be aware of their responsibility of weighing risks of the radiation exposure against the expected benefits, although, various studies (15, 16, 17, and 25) indicated that there is deficiency among medical students, doctors, paramedics and dentist in the knowledge and/or underestimation of the real radiation hazard from radiological procedures, more importantly, the CT scan.

Frequently scanned patients have large cumulative radiation doses and increased levels of risk (13) but we found (table -2-) that 5 patients had the current scan as the 2nd one, 3 of them (60%) were not informed about risk and only one patient was referred for the 3rd time, he was also not informed by neither of the health personnels, further evidence that, even in frequent use of CT, there was a deficiency in patients informing.

As shown in figure-2-, patient informing was more deficient in those referred from neuromedicine & general surgery (only 5 of 9 & 3 of 8 patients were informed respectively) while only half of patients referred from otolaryngology, orthopedic and pediatric clinics were informed about CT risk. Much concern of the risk is on pediatric & young patients (24, 26, 27, 28,) that it is important to realize the problem of pediatric CT-exposure, a problem which is complicated by the finding of Oikarinen H et al in 2009 that many of CT examination were unjustified (24).

Conclusion:

Most patients are unaware of the risk of radiation-induced cancer from CT scan and majority of them are not informed by medical personnel before examination about that hazard. Radiation's risk issue needs to be taken seriously and urgent actions with dedicated programs are recommended to educate patients (mainly by media) and to establish a reasonable patient-informing system that should be largely of health care provider's responsibility. This small-sample study emphasizes the necessity of further large-sample studies that assess awareness of patients as well as health care providers for that risk.

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