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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA

A questionnaire study about gonadal shield use of urologists

Ürologların gonad kalkanı kullanımı hakkında bir anket çalışması

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ABSTRACT

Objectives: Our aim is to reflect routines, awareness, and consciousness level of urologists about usage of gonadal shield (GS) in Turkey.

Materials and methods: Because of this objective a questionnaire which includes 15 questions was prepared. The questionnaire was delivered to urologists in a Turkish Urology congress. Data derived from 271 urologists by face to face interview were evaluated.

Results: Participant were urologists (n=271), consisted of professors (n=33), associate professors (n= 36), assistant professors (n= 36), specialists (n=94), and residents (n=81). According to the data obtained from the questionnaires, 22% of the participants acquired their first information about GS as a medical student, 44% during their residency training, and 14% of them had no information about GS at all. Besides 64% of them did not read any medical article about this subject until that time, and 54% them practically hadn't seen any GS during their urology practice. In 82% of the hospitals where participants were working hadn't had any GS, and 18% of the urologists had indicated that GS was available in their hospitals, and they used them once in a while. Urologists responded favorably (20%) or unfavorably (80 %) to the question of 'Do you find yourself or your colleagues adequately sensitive, and mindful about GS use?

Conclusions: Sensitivity and awareness about use of gonadal shields among Turkish urologists are not at a desired level and for this reason, it is not used widely. The urologists should be informed in urological academic platforms about gonad protecting devices.

Key words: Gonad shield, questionnaire survey, radiation, urologist

ÖZET

Amaç: Amacımız Türkiye'de gonad kalkanı kullanma konusunda ürologların dikkat, farkındalık ve hassasiyet düzeylerini belirlemektir.

Gereç ve yöntem: Bu amaçla 15 sorudan oluşan bir anket formu hazırlandı. Bu formlar bir ulusal üroloji kongresine katılan ürologlara dağıtıldı. Toplam 271 katılımcıdan yüz yüze görüşme sonucu elde edilen veriler incelendi.

Bulgular: 271 katılımcıdan 33'ü profesör, 36'sı doçent, 36'sı yardımcı doçent, 94'ü uzman ve 81'i asistan idi. Katılımcıların %22'si bu konuda daha önce gonad kalkanı hakkında, bilgi sahibi değildi. %44'ü tıp fakültesinde, %14'ü asistanlık döneminde ilk kez bilgi sahibi olmuştu. %64 katılımcı gonad kalkanı konusunda hiçbir makale okumamıştı. %54'ü ise daha önce hiçbir gonad kalkanı modeli görmemişti. %82'si hastanelerinde böyle bir aparatın olmadığını veya kullanmadıklarını belirtti. %18'i ise gonad kalkanı kullandıklarını belirtti. Ürologların %80'i ''kendinizi ve meslektaşlarınızı gonad kalkanı kullanma konusunda yeterince dikkatli ve hassas buluyor musunuz? '' sorusuna hayır cevabını verdi.

Sonuç: Türkiye'deki ürologlar arasında gonad kalkanı kullanma konusunda farkındalık ve hassasiyet yeterli düzeyde değildir ve bu yüzden kullanımı yaygın değildir. Ürologlar gonad koruyucu araçlar hakkında ürolojik akademik platformlar tarafından bilgilendirilmelidir.

Anahtar kelimeler: Gonad kalkanı, radyasyon, ürolog, anket çalışması

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INTRODUCTION

Thanks to the technological developments, radiological imaging modalities are used more frequently in the examination, and treatment of diseases.[1] In recent years in almost all fields of medicine, a shift from conventional methods to minimally invasive methods has been realized. Similarly, a trend towards minimally invasive methods in the diagnosis, and treatment of urologic abnormalities has been observed. For example, instead of kidney ureter bladder graphy (KUB), computerized tomography (CT) and in lieu of stone surgery electroshock wave lithotripsy (ESWL), percutaneous nephrolithotomy (PCNL), or retrograde intrarenal surgery (RIRS) are preferred.[2] This trend towards noninvasive methods has necessitated more frequent use of ionized radiation.[3] Especially in the diagnosis, and treatment of the diseases requiring uninterrupted monitorization (ie. Vesico-ureteral reflux) or those progressing with recurrences (ie. urolithiasis) radiological imaging modalities must be used more often. Frequent use of radiological examinations exposes urogenital system (especially testes-ovaries) to the hazards of radiation.[4] Particularly, during interventions performed in prone position (PCNL and ESWL) gonads are exposed to radiation from a very short distance. This issue should be considered more seriously in the pediatric patients with a small body surface area.

Beneficial, as well as deleterious effects of radiation used in the diagnosis, and treatment of diseases have been demonstrated.[5] In the UK, every year nearly 250-300 cases of death have been demonstrated to be related to direct exposure to medical radiation.[6] Because of cumulative effects of radiation, especially in the pediatric age group, and reproductive age this issue is more important.[7] In human body, gonads are one of the most vulnerable tissues against radiation. Even with doses used in radiological examinations, gonadal exposure to radiation might result in gonadal damage, and genetic mutation.7 In addition, both experimental, and clinical studies demonstrated permanent or transient adverse effects of radiation on male, and female fertility.[8] Therefore in all radiological studies routine use of gonadal shields are recommended.[9] With these protective methods, testes are exposed to 8-10-fold decreased doses of radiation.[10]

The effects of radiation exposure during interventional radiological procedures have not been elucidated yet. Therefore it is not definitively known which radiation dose harms what patient at what time. Therefore most of the physicians believe that even a single radiogram carries a risk though of small magnitude. As a result, the axiom of ALARA (as low as reasonably achievable) is accepted as a gold standard in the radiology practice.[11]

Even though harmful effects of radiation on gonads, and effective protection provided by gonadal shields (GS) have been recognized, these protective devices haven't entered into routine use. This is an interesting, and curious phenomenon. In the literature many questionnaire surveys measuring level of information of the physicians, and other healthcare professionals about radiation exposure are available.[12-14] However any study profiling the routine, and awareness of GS usage has not been performed yet.

Our aim is to reflect routines, awareness, and consciousness level of urologists about usage of GS in Turkey.

MATERIALS AND METHODS

For this questionnaire survey, approval of the Ethics Committee was obtained from Dicle University School of Medicine.

For this survey a national andrology congress with global participation was chosen. One week before the first day of the congress, congress secretary was informed about our request of conducting a survey. After obtaining secretariat's permission, we conducted the survey.

Questionnaire forms consisting of 15 items were distributed to 305 urologists, who participated in the congress organized in June, 2011. Each participant was informed briefly about the contents of the questionnaires. The participants were requested to complete questionnaire forms without mentioning their names, and institutions they worked. Questionnaire forms were retrieved during breaks. The participants were informed that data obtained from this questionnaire survey will be used in scientific studies. Questionnaire forms inquired age, institution, and duration of urology practice of the participants. They contained questions about the follow-

ing items; number of medical articles/papers read about gonadal shields, their usage routines of GSs, frequencies of their use, related sensitivities on their usage, whether or not they believed the necessity of gonadal shield usage or inquired their infertile male patients about their exposure to radiation.

Questionnaire form used in the study is shown in Table 1.

Academic titles of the participants were comparatively matched with the responses they have provided.

RESULTS

Questionnaire forms were allocated to 305 urologists, and 23 (7.5%) of them declined to complete these forms. Eleven (3.6%) urologists completed these forms erroneously. Participant urologists (n=271) consisted of professors (n=33), associate professors (n= 36) , assistant professors (n= 36), specialists (n=94), and residents (n=81).

Mean age of the participants (37.2 years), and mean duration of their professional practice (8.7 years) were recorded. The participant urologists were working in the university hospitals (n=127), state hospitals (n=91), or training, and research hospitals (n=53). All of the participants were male.

According to the data retrieved from the questionnaires, 22% of the participants acquired their first information about GS as a medical student, 44% during their residency training, and 14% of them had no information about GS at all. Besides 64% of them did not read any medical article about this subject till that time, and 54% them practically hadn't seen any GS during their urology practice. In 82% of the hospitals where participants were working hadn't had any GS, and 18% of the urologists had indicated that GS was available in their hospitals, and they used them once in a while. Eighty-seven percent of the participants defined themselves as indifferent to GS use, while 47 of them believed that GS must be used during radiological examinations. Fifty- one percent of the participants thought that GS use is partially useful, and 2% of them stated that GS use was not required at all. Ninety-five percent of the participants indicated that they wished GS to be used when an abdominal CT was required from their intimates or children. Sixty-six percent of the urologists believe that GS use in radiology units might even change the patients' hospital preferences. Urologists' responses to the question 'Why do you think that gonadal shields are not used frequently?" were recorded as negligence (60%), masked urogenital region (34%), and their insufficient knowledge (25%) about GS use. According to the questionnaire survey, urologist participants always (22%) or occasionally (44%) ask their male patients consulted to them because of infertility about radiation exposure, and their related occupations. While 22% of the urologists had never inquired about radiation exposure.

Urologists responded favorably (20%) or unfavorably (80%) to the question: 'Do you find yourself or your colleagues adequately sensitive, and mindful about GS use?'

Majority (78%) of the participants believed, but the rest (22%) wasn't convinced that frequent radiological examinations might lead to infertility in the long-term. Eighty- three percent of the participants believed that neglecting GS use during fluoroscopic procedures might potentially lead to legal suits. Ninety-seven percent "yes" responses were obtained for the question 'Are you interested in any scientific debate about 'urology, and radiation exposure' in any a scientific meeting or a congress? This response rate was the same throughout all academic groups.

Responses to the questions included in the survey were matched with academic titles of the participants (Table 2-4). Accordingly, in the group consisting of participants with the highest academic degrees, the level of knowledge, and sensitivity about GS use were higher. For example among professors, mean number of articles read about GS were 3.1, while among residents it dropped down to 0.87. Professors (66%), associate professors (51%), assistant professors (44%), urologists (30%), and residents (19%) questioned their patients about radiation exposure in the order of decreasing frequency as indicated. Participants in all academic groups believed the necessity of using GS at nearly similar percentages (98%).

Table 1. A questionnaire investigating attitudes and conscious -awareness of Urologists in Turkey related to the usage of Gonadal Shields (GS)

1	In your professional life when have you first got informed about GS ? When I was a a. Medical Student b. Resident c. Urologist d. at a later date
2	Up to now how many medical articles have you read about GSs? a. None b. 1 c. 2 d. 3 e. ≥ 4
3	Have you ever seen a GS product in your urologic practice? a. Yes b. No
4	Is GS available for the patients in the health care institute you are working for? a. Yes b. No
5	Are you using a GS with the aim of protecting your patients from radiation exposure during an intervention requiring fluoroscopic imaging? a. I have never used b. I've been using occasionally c. Most of the time I am using
6	Do you think/believe that GK use is an absolute necessity? a. Absolutely necessary b. Its use is beneficial c. Not at all
7	If you had a GS in your operating room for your patients, would you use it during PCNL or RIRS procedures? a. Yes b. No
8	If during a PCNL procedure or an abdominal CT examination performed on your child or an intimate friend, a GS is required, would you required this GS to be used? a. Yes b. No
9	Do you think that GS usage during radiological examination or fluoroscopy will effect patient's preference for that hospital? a. Yes b. No
10	Do you think that you, and other urologists are adequately sensitive about GS use during interventions requiring fluoroscopy? a. Yes b. No
11	Why GSs are not used frequently? (more than one option can be ticked) a. Costly b. Difficult to use c. Negligence, and indifference d. Not required e. Difficult to obtain f. Masks urogenital field of vision
12	Do you direct your infertile patients questions about previous or current radiation exposures (frequent radiologic examinations, radiotherapy)? a. Always b. Occasionally c. Never
13	If a male patient who had necessarily undergone frequent radiologic examinations (IVP, CT, VCUG) without gonadal shield protection, consult to you years later with infertility problems, would you think that GS disuse is a causative factor for his infertility? a. Yes b. No
14	Does a workshop organized on "Urology and Radiation Exposure" in a urology congress attract your attention? a. Yes b. No
15	Do you think that disuse of GS during fluoroscopic interventional procedures can raise legal issues between patient, physician, and insurance company? a. Yes b. No

Table 2. Numbers of medical article read about gonadal shields (GSs)

Question: Up to now how many medical articles have you read about GSs?						
Participant / Answer		None	1	2	3	≥ 4
Professor,	n=33	-	10	7	6	10
Associate professor,	n= 27	2	10	8	6	1
Assistant professor,	n= 36	11	12	6	3	4
Specialist,	n= 94	32	33	22	3	4
Residents,	n= 81	66	9	4	2	-
Total	n=271, %	111 (41%)	74 (27%)	47 (17%)	20 (8%)	19 (7%)

Table 3. Frequency of using gonadal shields (GSs)

Question: Are you using a GS with the aim of protecting your patients from radiation exposure during an intervention requiring fluoroscopic imaging?			
Answer	Always	Occasionally	Never
n= 271, %	10 (4%)	38 (14%)	223 (82%)

Table 4. Why gonadal shields (GSs) are not used frequently? (more than one option can be ticked)

Answer	Costly	Difficult to use	Not required	Neglect	Masks urogenital field of vision	Insufficient knowledge	Difficult to obtain
n=271, %	21 (7%)	98 (36%)	12 (4%)	180 (85%)	66 (24%)	71 (26%)	27 (10%)

DISCUSSION

Since discovery of X-rays by Roentgen in 1895, application of radiological techniques has almost become an indispensable tool in the field of medicine.[15] Since then, ionizing radiation has been employed as a first choice in the diagnosis of many diseases, and treatment of some types of malignancies.[16,17] Thus, imaging techniques using ionizing radiation are being used more frequently. For example in the USA, number of CTs performed escalated from 3.6 million in 1980, and 13 million in 1990 up to 33 million in 1998.[15] Although a similar investigation has not been conducted in our country, we guess that similar trend is still in vogue. Indeed, healthcare institutes, and radiology units are becoming more prevalent, and also perioperative imaging techniques are being used more frequently because of increased number of endoscopic surgeries performed.

Even though deleterious effects of ionizing radiation on human body (especially on gonads) are recognized by almost everyone,[8] adequate awareness of potential hazards of radiation exposure is debatable.

In the literature, many studies are available which evaluate awareness, and levels of knowledge about medical radiation procedures among health care professionals (predominantly physicians).[16-18] A striking conclusion that can be derived from these studies reveals that radiation conscious-awareness is not sufficiently stronger among physicians, and health care professionals. In our study, similarly, 80% of the urologists indicated that their conscious, awareness, and sensitivities about GS use were not satisfactory.

Indifference about protection from radiation can be attributed to various factors. In the literature, a questionnaire survey conducted among medical students, and primary care physicians revealed that fundamental radiological knowledge of participants was very limited. The authors interpreted this result as an insufficient medical training on the hazards of radiation exposure.[19] In our study, 88% of the participants had not receive any information about GS during their medical education, while 32% of them admitted that they had got informed about the subject during their residency. This conclusion cast suspicions about inadequacy of the notion of radiation-conscious awareness created during medical education, and training both in our country, and abroad. We believe that more comprehensive informative and consciousness raising efforts should be implemented about radiation hazards beginning from the time of enrollment into medical faculty extending through every step of medical training. In a literature study, it was shown that training programs on protection from radiation significantly enhanced the degree of awareness, and vigilance for hazards of radiation exposure.[20] Also in our study, the number of articles read about GSs have increased, in parallel with the academic career of the participants. In parallel with this finding, an increase in the level of sensitivity about GS usage was observed. Accordingly, the frequency of GS usage was at its highest level among professors, and at its minimum among residents. These data emphasize the importance of training on this subject, and also demonstrate that with proper scientific support this indifference can be overcome. Medical faculties, and other resident training, and research hospitals, and health care institutes must assume important tasks.

Clinical trials have demonstrated that occupational exposure to radiation can affect fertility potential at various degrees ranging from transient oligospermia to permanent infertility. For example, among radar operators exposed to harmful effects of radiation, serious impairment of semen parameters, and also DNA damage were detected.[21] In another trial, chromosomal abnormalities were detected in peripheral blood cells of hospital professionals chronically exposed to lower doses of radiation.[22] Especially individuals chronically exposed to lower doses of radiation carry serious risks. Therefore during radiological interventions involving urogenital region in the reproductive period, gonadal shields are strongly recommended.[23] Twenty-two percent of our participant urologists indicated that they hadn't directed any question to their infertile patients about their potential radiation exposures Half of the participants indicated that they had from time to time questioned their patients about this issue. This finding suggests priority of radiation exposure in history taking process of infertile male patients. Therefore, we believe that the adverse effects of radiation in infertility should be repeatedly emphasized in scientific platforms.

In the literature limited numbers of studies have investigated the usage of gonad protective devices.[10] Gonadal shields are available in various types such as plaques, blankets, wrap-around, clam-shell types. A literature study has demonstrated that most of the time gonadal shields are not used widely or they are positioned erroneously.[24] A separate study indicated that GS use was impractical, and it covered the operative field of vision.[25] We have also arrived at similar conclusions. Accordingly, as reasons for infrequent use of gonadal shields, 74% of our participants suggested their complicated application, and coverage of urogenital field of vision. For an urologist, this problem will become a prominent issue in interventions involving urogenital region. Literatures studies together with ours suggest that GS models used in the previous studies were not ideally designed. Application of clam-shell, and plaque type GSs poses difficulties especially for procedures performed in the lithotomy or prone positions. As indicated in the literature, gonadal shields in the form of plaques does not protect against laterally directed radiation beams.[26] Ideally we thought that an ideal GS should enclose the testes from all sides without covering urogenital region. We agree that a R&D study should be performed on this issue in collaboration with urologists, and radiology engineers.

Literature data have demonstrated that even a single abdominal CT carries a risk of carcinogenetic development with an incidence of 1/2500.[27] According to data provided by National Radiological Protection Board (NRPB) in all interventional procedures usage of a gonadal shield is recommended far as possible. Based on the declaration of this committee there is no such thing as "harmless radiation dose".[28] Accordingly, every radiological examination carries a risk though at a minimal level. Our study participants believed that 98% of radiological procedures pose a potential risk for the patient's health state. Possibly because of this belief, 87% of the participants thought that refraining from GS use during interventional procedures might lead to legal suits in the long run. Indeed, as admitted by 80% of the participants the reasons for refraining from GS use were negligence, and indifference. As already known, according to the laws, negligence's during diagnostic, and /or therapeutic processes call for material, moral, and legal sanctions. In consideration of increased awareness of patients' rights in public, neglected use of GS might lead to the implementation of legal sanctions. We are convinced that national associations of urology, and radiology should organize a collaborative relevant workshop with legislative bodies.

One of the interesting data we obtained from this questionnaire survey was that most of the urologists believed that GS use might even influence patients' hospital preferences. This issue of GS use should be clarified by interrogating with the patients and normal healthy individuals as well. This phenomenon is the subject matter of another separate study.

Literature reviews have demonstrated that training programs are important steps towards increasing awareness about the hazards of the radiation exposure.[29,30] Also in our study, 97% of the participants were willing to attend sessions on "Urology, and Radiation Exposure" in scientific meetings. This intensive demand indicates candide efforts of urologists in understanding, and solving this challenging issue.

Sensitivity and awareness towards use of gonadal shields among Turkish urologists are not at a recommended level. For this reason, it is not used

widely. Training programs should be instituted beginning from medical faculties up to every stage of urology profession, and physicians' degree of awareness about this issue should be promoted. We think that with scientific and academic support, degree of consciousness, and awareness of the physicians to deleterious effects of radiation exposure might surge rapidly. For the realization of this end, an pioneer role is anticipated from urologic or radiological scientific platforms Willingness of the urologists to participate in training programs is an encouraging step towards solution of this issue.

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