The Importance of Radiology Consultation in Forensic Report Preparation: A Retrospective Study

Adli Rapor Düzenlemede Radyoloji Konsültasyonunun Önemi: Bir Retrospektif Çalışma

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Abstract
Amaç: The aim of the present study is to draw attention to the importance of radiology consultation which is needed during medical evaluation and report preparation process.

Material and Method: The records of 72 cases who applied to Forensic Medicine outpatient clinic between June 2016 and October 2019 and whose consultations were requested from Radiology department to prepare a forensic report were examined retrospectively. Age and gender of the cases, the type of event, the date of the report, the reason for requesting consultation and the impact of the consultation on forensic report were investigated.

Results: Of the 72 cases included in the study, 58 (80.6%) were male, while 14 (19.4%) were female. The cases were between the ages of 17 and 78 and mean age was calculated as 36.6 (st ±16.1) years. It was found that 43 (58.9%) of the consultations were requested because of “contradiction between the examination report prepared by radiology department and medical reports prepared by emergency or other clinical physicians”. Previous imaging reports of 21 (48%) of these consultations were changed in accordance with the opinions of physicians of emergency service or other clinics.

Conclusion: According to the legal legislation of our country, physicians are obliged to report judicial authorities and to prepare a judicial report if requested when they come across a judicial case. In order for forensic medical evaluation to be made in the most appropriate way and to prepare the forensic report, all examinations and treatments should be completed first. In addition, if there is a contradiction in the medical reports, examinations or consultation from the related clinical branch may be requested. Consultations make a significant contribution to the most accurate completion of forensic medical evaluation and the prepared medical report.

Anahtar Kelimeler: Forensic medicine; forensic report; radiology consultation

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Aim: Bu çalışmada, adli tibbi değerlendirme ve rapor düzenleme sürecinde ihtiyaç duyulan Radyoloji konsültasyonun önemine dikkat çekilmeye amaçlanmıştır.

Materiyal Metod: Haziran 2016 – Ekim 2019 tarihleri arasında Adli Tip polikliniğine başvuran ve adlı rapor düzenlenemesi için Radyoloji bölümünden konsültasyon istenen 72 olguna ait kayıtlar retrospektif olarak incelenmiştir. Olguların yaş ve cinsiyeti, olayın türü, düzenlenen raporun tarihi, konsültasyon isteme nedeni, konsültasyon sonucunun adlı rapora etkisi araştırılmıştır.

Bulgular: Çalışmaya dahil edilen 72 olgunun 58’si (%80,6) erkek, 14’ü (%19,4) kadındır. Olgular 17 – 78 yaş aralığında olup yaş ortalaması 36,6 (st ±16.1) yıl olarak hesaplanmıştır. Konsültasyonların 43’ünün (%58.9) “Radyoloji bölümünce düzenlenen tıbbi konsültasyon ile acil veya diğer klinik hekimlerince düzenlenen tıbbi konsültasyonu oluşturan çelişki” nedeniyle istendiği belirlenmiştir. Bunlardan 21’inin (%48) daha önce düzenlenmiş görüntüleme raporun acil veya diğer klinik görevlendirmenin tıbbi konsültasyonu oluşturduğu çelişkisine neden olmuştur. Bunlardan 21’inin (%48) daha önce düzenlenmiş görüntüleme raporun acil veya diğer klinik görevlendirmenin tıbbi konsültasyonu oluşturduğu çelişkisine neden olmuştur. Bundan dolayı, sonucunun öne çıkmasına yeteneği sağlamaktadır.

Sonuç: Ülkcemiz yasal mevzuatına göre hekimler adlı olgulara karşılaşmalari halinde bu durum adlı mercilere bildirmek ve istemlenmesi halinde adlı rapor düzenlemele yükümlüdür. Düzenlenen bu raporlar soruşturma ve yargılama aşamalarında büyük önemde sahiptir. Adlı tibbi değerlendirme için uygun şekilde yapılabilmesi ve adlı raporun düzenleme eç için önlemler tıbbi raporumun acil veya diğer klinik görevlendirmenin tıbbi konsültasyonun istenmemesidir. Konsültasyonlar, adlı tibbi değerlendirme ve düzenlenen adlı raporun en doğru şekilde tamamlanmasına önemli katkı sağlamaktadır.

Keywords: Adlı tip; adlı rapor, radyoloji konsültasyonu

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INTRODUCTION

The science of radiology has been playing an active role in medicine since the invention of X rays and imaging methods are used as an important diagnostic tool in today's medical practices (1). In trauma cases, radiological imaging methods requested after examination are among the first used diagnostic tools (2). Trauma cases have forensic character. Following the referral of the case that is exposed to trauma to the health institution, healthcare professionals are obliged to notify the judicial authorities (3). The notification can be oral or written. After the notification, the judicial authorities are requested to prepare a report stating the medical state of the case. The physician who is asked to prepare a judicial report is obliged to fulfil this duty as an expert (4). In the evaluation of crimes of injury in terms of forensic medicine, the guide entitled “Evaluation of criminal injuries defined in Turkish Criminal Code (TCC) in terms of forensic medicine” was prepared in 2005 in order to provide a nationwide standard in the forensic evaluation of criminal injuries and it was updated in 2013 and 2019 (5).

Diagnosis made to trauma cases by the evaluation of imaging tests requested in emergency services by emergency physicians or other clinic physicians and Radiology final report may differ from time to time. It has been reported that even as a result of the evaluation of the same test by more than one radiologist, different reports can be issued and thus different results may appear (6). This contradictory situation causes problems in the preparation of forensic reports. In order to carry out a healthy and fair process, final results should be written while writing a forensic report and contradictory expressions should be avoided (6,7).

During the process of forensic medical evaluation and report writing, all medical examination and observation documents are evaluated together. Different medical results in medical records cause contradiction during the report preparation process, and this contradiction causes the prolongation of report preparation process and indirectly the trial process (7).

The aim of the present study is to draw attention to the effects of radiology consultation requested due to the contradiction between the imaging report and the diagnosis made by the emergency physician or other clinical physicians on forensic medical evaluation. Forensic report preparation process and trial process with forensic report result and to contribute to literature with the results obtained.

MATERIAL and METHODS

The present study is a retrospective study. The records of 72 cases who applied to Forensic Medicine outpatient clinic between June 2016 and October 2019 and whose consultations were requested from Radiology department to prepare a forensic report were examined. Age and gender of the cases, the type of event, the date of the report, the reason of for requesting consultation and the effect of the consultation on forensic report were investigated.

The data were analysed with SPSS program (version 22.0). Demographic data were expressed as mean value ± standard deviation and/or percentage, comparison values were calculated at 95% confidence interval and p<0,05 was considered as statistically significant.

The ethics protocol of the study was approved by S.B.Ü. Bozyaka Training and Research Hospital Clinical Researches Ethical Board (decision number: 01; approval date: 09/10/2019) and the study was conducted in accordance with the Declaration of Helsinki.

RESULTS

Of the 72 cases examined in the study, 58 (80,6%) were male, while 14 (19,4%) were female. Mean age of the cases who were between the ages of 17 and 78 was found as 36,6 (st ±:16.1) years. Consultation was requested in 27 (%37,5) battery and 25 (%34,7) traffic accidents. Demographic information of the cases is shown in Table 1. It was found that in 43 (58,9%) of the 72 cases included in the study, consultations were requested because of “contradiction between the imaging report and the remarks of the emergency physician or other clinical physician”. Reasons for requesting consultation are shown in Table 2.

| Table 1. Demographic data |
|---------------------------|
| n | % |
|---|---|
| Gender | | |
| Male | 58 | 80,6 |
| Female | 14 | 19,4 |
| Total | 72 | 100,0 |
| Number of reports by years | | |
| 2016 | 13 | 18,1 |
| 2017 | 16 | 22,2 |
| 2018 | 26 | 36,1 |
| 2019 | 17 | 23,6 |
| Total | 72 | 100,0 |
| Type of event | | |
| Battery | 27 | 37,5 |
| Traffic accident | 25 | 34,7 |
| Sharp object injury | 14 | 19,4 |
| Firearm injury | 1 | 1,4 |
| Falling down from height | 3 | 4,2 |
| Age determination | 1 | 1,4 |
| Burnt | 1 | 1,4 |
| Total | 72 | 100,0 |
Previous imaging reports of 21 (48%) of the 43 cases who received consultation as a result of contradiction were changed in accordance with the remarks of physicians of emergency service or other clinics. The data of the changes that occurred in imaging reports after the consultation requested from radiology department are shown in Figure 1.

When the effects of the 21 imaging reports that were changed on the forensic report issued were examined; it was found that the reports following judicial report were found to cause a change as "Not mild enough to be resolved with simple medical intervention (SMI)" in 13 cases (%61,9), while 5 (%23,8) were found to cause a change as "caused vital danger (VD)" (Table 3).

It was found that no reports were issued to 3 cases (0,4%) since the contradiction was not solved despite radiology consultation and it was found that a recommended was made to ask for the opinion of Forensic Medicine Institute or university hospitals departments of forensic medicine.

**DISCUSSION**

It can be seen that there are few studies in our country which are similar to our study. In a study in which a total of 371 consultations were requested to 333 cases, it was reported that consultation was requested from radiology department to clarify the suspicion of fracture/dislocation in 56,9%, to find out which bones had fracture/dislocation in 18%, to find out the localization of the fracture in the bone in 6,2%, to find out the type of fracture in 4,8%, to find out the degree of subsidence in the current fracture in 4%, to clarify whether the injury was suspicious internal organ injury.
or injury to the abdomen/ chest cavity in 21.3%, to solve
the contradiction between imaging report and clinical
diagnosis in 5.4%, to evaluate whether there was a causal
link between trauma and the existing lesions in 2.1%, to
evaluate the localization or nature of the foreign object
in the body in 1.6% and to evaluate the degree of joint
separation in 0.5% (7). Consultation has been defined
as the physician’s receiving the scientific information
he/she needs outside of his/her field of specialization
from physicians in other related specialities and as a
result of scientific developments, it has become an
indispensable part of today’s medical practices (8). In
forensic medicine practices, consultation is requested
from the related branch for contradictory situations that
need to be clarified in medical records during the process
of forensic medical evaluation and report preparation.

In our country, the first evaluation of trauma cases is
made by emergency service physicians. Depending on
the type of trauma, consultation is requested from the
related branches and the first evaluation of traumatic
lesions is made by the emergency service physician or
other clinical physicians (9). In the present study, it
was found that previous imaging reports of 21 (48%) of
these consultations were changed in accordance with the
remarks of physicians of emergency service or other
clinics after the radiology consultation. According to a
study in which diagnostic errors in cases with multiple
traumas were reported, it was stated that other injuries
may be missed in case of determining the diagnosis which
is the hospitalization indication in cases with multiple
injuries (10). In a study conducted in our country in which
diagnostic errors were examined in emergency service, it
was reported that the most common type of errors that
cauced missed diagnoses were radiological errors and
the most common radiological errors were caused by
“misinterpretation of the clinician”, “radiological imaging
errors” and “delays in reporting” (11). In the present
study, it was found that a significant part (58.9%) of the
consultations requested from radiology department
were requested due to “contradiction between imaging
report and the remarks of emergency service physician
or other clinical physician”, which was in parallel with the
literature.

In the present study, radiology department was consulted
for vertebral subsidence percentage in 4 cases (5.6%),
for the localization of the fracture in the bone in 4 cases
(5.6%), and for the old/new distinction of the fracture
in 2 cases (2.8%) and thus the fractures were detailed.
After consultation, it was determined that the fractures
were new fractures. The presence of bone fracture
causes the injury to be not mild enough to be treated
with SMI. In addition, the fracture’s being linear, partial
or open and the percentage of vertebral subsidence
determines the extent to which the fracture affects vital
functions (5,12,13). In the guide entitled “Evaluation
of criminal injuries defined in TCK in terms of forensic
medicine”, “visceral injuries and injuries penetrating to
body cavities (chest/abdominal cavity)” are defined as
“injuries causing VD” (5). In the present study, as a result
of radiology consultations requested to find out injury
trace, it was found that the injuries of 5 firearm and sharp
object cases caused VD. Detection of bone fractures in
the case exposed to trauma, the degree of impact of the
fractures and the injury’s causing VD change the result
of the forensic report and thus influence the course of
the investigation and trial (3).

In the present study, although consultation was requested
from the radiology department, the contradiction in the
injuries of 3 (0.4%) cases were not clarified and no
forensic report was issued. In such cases, it may be
beneficial to carry out medical evaluation by a higher
authority that consists of more equipped and competent
boards. In the present study, it was recommended to ask
for opinion from Forensic Medicine Institute or university
hospitals forensic medicine departments for the cases
in which the contradiction was not clarified and it is
thought that the evaluations made in boards established
in such centres will contribute to the clarification of the
contradiction.

In a study in which diagnostic errors in today’s medical
practices were examined, it was reported that missed
diagnoses in trauma patients occurred in extremities
the most and this was caused most frequently by
physicians’ focusing primarily on visceral organs and
neglecting extremity traumas (14). In the present study,
it can be seen that the changes in the imaging reports of
21 cases after consultation were reflected in the forensic
report. After consultation, the reports of 13 cases were
changed as “not mild enough to be resolved with SMI”,
the reports of 5 cases were changed as “caused VD”,
the reports of 2 cases were changed as “mild enough
to be resolved with SMI” and the report of 1 case was
changed as “did not cause VD”. In a study conducted
with Kavaklı, it was reported that 35.7% of the cases that
were thought to be mild enough to be resolved with SMI
were concluded not to be mild, 13.4% of the cases that
were not thought to be mild enough to be resolved with
SMI were concluded to be mild; 30.6% of the injuries that
were thought to cause VD were concluded not to cause
VD and 5.8% of the injuries that were thought not to
cause VD were concluded to cause VD (7). The issues in
forensic reports indicate the nature of the injury and the
nature of the injury can cause changes in the course of
investigation and in the amount of penalty to be given as
a result of trial. When considered from this perspective,
it can be seen that the consultations requested can
influence forensic report preparation directly, while they
can influence the investigation and trial indirectly.

**CONCLUSION**

The guide named “Evaluation of criminal injuries defined
in TCC in terms of forensic medicine” is used in forensic
medicine evaluation process and report preparation. In
addition to evaluation criteria in these reports, judicial
authorities can also ask forensic experts questions such
as the trace of injury, bone fracture’s being old/new,
bone age determination, craniectomy area, percentage of vertebral subsidence.

During the process of forensic report preparation, all medical examination and observation documents are evaluated together and the complaints stated in the anamnesis taken before examination are also taken into consideration. According to the evaluation made, new examinations and/or consultations are requested if needed and traumatic lesions that are likely to be missed are identified. In case of contradiction between imaging report and clinician, radiology consultation will contribute to making a healthier forensic evaluation and to issue the forensic report in the most correct way.

**Conflict of Interest:** The authors declare that they have no competing interest

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**Ethics committee approval:** The ethics protocol of the study was approved by S.B.Ü. Bozyaka Training and Research Hospital Clinical Researches Ethical Board (decision number: 01; approval date: 09/10/2019) and the study was conducted in accordance with the Declaration of Helsinki.

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