The Completeness of CT Scan Request forms in the Emergency Period of Rajavithi Hospital

Chitwiset S
Department of Diagnostic Radiology, Rajavithi Hospital. College of medicine, Rangsit University, Bangkok Thailand
(Email: seksanchit@hotmail.com)

ความครบถ้วนของข้อมูลในใบส่งตรวจเอกซเรย์คอมพิวเตอร์ในช่วงเวลาฉุกเฉินของโรงพยาบาลราชวิถี

เศกสรร จิตวิเศษ พ.บ.
แผนกรังสีวินิจฉัย โรงพยาบาลราชวิถี, คณะแพทยศาสตร์ มหาวิทยาลัยรังสิต 2 ถนนพญาไท เขตราชเทวี กรุงเทพมหานคร 10400

บทคัดย่อ

วัตถุประสงค์: ใบส่งตรวจทางรังสีวิทยาเป็นเครื่องมือสำคัญสำหรับการติดต่อระหว่างแพทย์ผู้ดูแลคนไข้กับแผนกรังสีวิทยา ประกอบด้วยข้อมูลสำคัญ เช่น ข้อมูลส่วนบุคคลของคนไข้ ข้อมูลทางคลินิก ส่วนร่างกายที่ต้องการส่งตรวจ และข้อมูลเกี่ยวกับแพทย์ จึงได้มีการสำรวจความครบถ้วนของข้อมูลในใบส่งตรวจเอกซเรย์คอมพิวเตอร์ในช่วงเวลาฉุกเฉินของโรงพยาบาลราชวิถี **วิธีการ:** ศึกษาความครบถ้วนของข้อมูลในใบส่งตรวจเอกซเรย์คอมพิวเตอร์เวลาฉุกเฉินย้อนหลัง ตั้งแต่กันยายน 2560 ถึง ธันวาคม 2560 **ผล:** จากการศึกษาใบส่งตรวจเอกซเรย์คอมพิวเตอร์ จำนวน 1,000 ใบ มีการใช้สติกเกอร์บนใบตรวจ ร้อยละ 100 ประกอบด้วย ข้อมูลส่วนบุคคล เช่น ชื่อ อายุ เพศ ทำให้ข้อมูลครบถ้วนร้อยละ 100 มีการให้ข้อมูลทางคลินิก ร้อยละ 99.7 การวินิจฉัยโรค ร้อยละ 95.2 บอกส่วนตรวจเอกเรย์คอมพิวเตอร์ ร้อยละ 99.7 ข้อมูลเรื่องวันที่ประจำเดือนครั้งสุดท้ายเพียงร้อยละ 18.86 ข้อมูลเกี่ยวกับชื่อแพทย์ผู้ส่งตรวจร้อยละ 93.7 แพทย์ที่ปรึกษาร้อยละ 51.3 เบอร์โทรศัพท์ติดต่อแพทย์ร้อยละ 31.4 **สรุป:** ใบส่งตรวจเอกซเรย์คอมพิวเตอร์เวลาฉุกเฉินมีการให้ข้อมูลที่ไม่ครบถ้วน ซึ่งต้องการแก้ปัญหาต่อไป เช่น มีการตรวจสอบใบส่งตรวจเป็นระยะ ปรับปรุงหรือสร้างแบบมาตรฐานกรอกใบส่งตรวจผ่านระบบคอมพิวเตอร์ หรือระบบอิเล็กทรอนิกส์

คำสำคัญ: ใบส่งตรวจ ความครบถ้วน ใบส่งตรวจเอกซเรย์คอมพิวเตอร์ ฉุกเฉิน

Abstract

Objective: Radiologic request forms are the essential tools for the communication between clinicians and radiological departments that require the essential data, including the patient's biodata,clinical information, the requisite investigation and the physician's information. The aim of this study is to audit the adequacy of completion of CT scan request forms received at the CT unit in the emergency period of Rajavithi hospital. **Methods:** The retrospectively descriptive study was performed to measure the completeness of the request for CT studies in the emergency period between September 2016 and December 2016. **Results:** A total of 1000 CT request forms were analysed. These were used in sticker 100% that contained biodata, filled data of name, age, sex 100%. The clinical information, provisional diagnosis and examination part were filled 99.7%, 95.2% and 99.7% respectively. The last menstruation period was filled only 18.86%. The filling rate of referring clinician's name, consultation in charge and clinician phone's number were filled 93.7%, 51.3% and 31.4% respectively. **Conclusion:** The study revealed inadequate filled radiological request form. Further solving of the problem is recommended.

Keywords: Request form, Completion, Computerized tomography request form, Emergency

Introduction

Radiologic request forms are the essential tools for the communication between clinicians and radiological departments[1-2]. The request is an important document recorded for the patient to undergo the radiological procedure[3]. The radiological request should provide sufficient and legible data for appropriate patient management.

The Royal College of Radiologists suggests that all forms should be adequately and legibly completed to avoid any misunderstanding that may arise[4]. All radiological request forms should contain adequate clinical and demographic information which identifies the patient and the destination of the report. All referrals should include the following: the clinical background, the question to be answered, the patient's name, age, address and phone number, the ward or location of the patient, the name of the requesting practitioner and the name of the consultant or general practitioner looking after the patient [4].

The importance of the clinical information provided is also clearly outlined in the United Kingdom's Department of Health. The Ionising Radiation (Medical Exposure) Regulations (IRMER) 2,000, which in Section 8.6.1 states that: "Regulation[5] (5) requires the referrer to supply the practitioner with sufficient medical data, relevant to the medical exposure requested, to enable the practitioner to decide whether the exposure can be justified[5]. No standard format for radiological request forms is available. Different organizations use their own personalized version[6-7].

The computed tomography (CT) is an ideal imaging modality for evaluating the acute abdomen, combining speed and reproducibility with the accuracy greater than 87%[8-10]. Newer techniques, principally automatic tube current modulation and iterative reconstruction algorithms have reduced the radiation dose associated with the CT[11]. Furthermore, the CT performed in the emergency department has been shown to enhance efficiency by decreasing the time for surgical intervention and to be cost-effective, reducing hospital admission rates and the need for more basic imaging. In the emergency department, physician's diagnosis, diagnostic confidence, and management are likely to change following the performed CT[12].

There is the evidence that inadequate clinical information is associated with an increased level of inaccurate reports[13-15]. The accurate clinical information is more likely to assist the radiologist in constructing a report, which in turn will help the referring practitioner in the management of the patient.

Previous studies have shown that up to 20% of radiographic examinations are clinically unhelpful[16]. The prevalence of inadequately completed radiological request form is considered widespread[17-19].

The aim of this study is to audit the adequacy of completion of CT scan request forms received at the CT unit in the emergency period of Rajavithi hospital as a tertiary institute.

Material and Methods

The retrospective descriptive study was performed to measure the completeness of the request for CT studies in the emergency period. This is a review of 1,000 radiological request forms received for CT examination at Radiology department of Rajavithi hospital in emergency period between September 2016-December 2016. The forms have been examined in comparison to the standard all the items are filled. The data had entered using SPSS version[13] statistical software and analyzed descriptively and the results are presented in the following tables and figures.

Result

A total of 1,000 CT scan request forms in the period of approximately 3 months were reviewed with the mean age of 52.23 years old, 19.32 years of standard deviation of age, 11 years old and 98 years old of minimum and maximum age. Separated by sex, all data consist of 609 males and 391 females in the Table 1 and Figure 1. The frequency distribution of completing items in the request forms and percentage is shown in Table 2.

Table 1 Descriptive statistics of Age

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Age	1,000	52.23	19.32	11	98

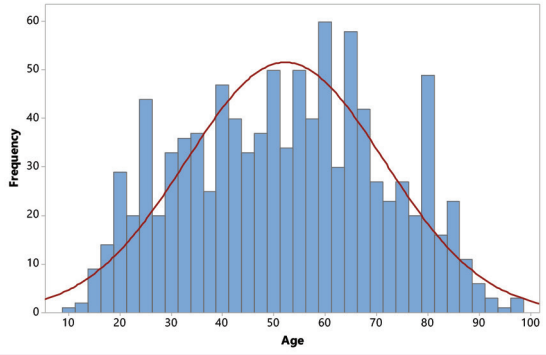

Figure 1 Histogram of Age

Table 2 Completion of all radiologic request forms

Items in the RRF	Percentage
Sticker	100.00
Name	100.00
Age	100.00
Sex	100.00
Hospital number (H.N.)	100.00
Telephone number	3.41
Ward/Clinic	53.70
Previous CT	60.80
Last menstrual period (LMP)	18.86
Clinical information	99.70
Provisional diagnosis	95.20
Contrast allergy	45.80
Drug allergy	1.10
Patient consciousness and ventilation status	55.8
Estimated glomerular filtration rate (eGFR)	55.30
Creatinine level	56.80
Examination part	18.86
Referring clinician's name	93.70
Consultant physician in charge	51.30
Clinician's telephone number	31.40
Total completeness	0.2

Values are presented as %.
CT=computerized tomography, LMP=last menstrual period, eGFR=estimated glomerular filtration rate

The sticker containing the personal data including name, age and ward, is used 100%, instead of writing in the request form. The percentage of filling the last menstrual period (LMP) in the female is about 18.86% which the percentage in reproductive females is about 6.42%.

The distribution of the wards or the departments in charge of the patients in this study is about 44.5% of emergency unit (ER unit), about 45.8% for inpatients, 1.10% for outpatients.

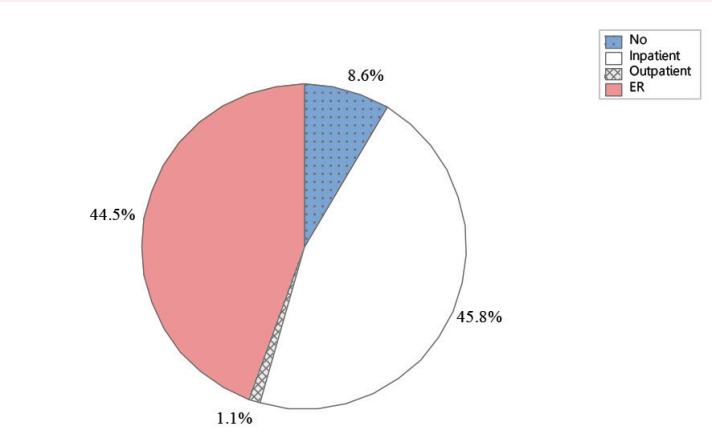

Figure 2 Histogram of Department

No=no information, ER=emergency department

For clinical data, the clinical information was filled in about 99.7%, and 95.2% for provisional diagnosis. The history of the contrast allergy or the drug allergy were filled in about 45.8% and 1.10% respectively. The renal function including estimated glomerular filtration rate (eGFR) were filled in about 55.30% and about 56.80% for creatinine level.

The examined part was filled in about 99.70% and about 50.2% of this group was brain CT. About 93.08% of the request forms is legible. Uncommon abbreviations was noted in about 1.91%.

For clinician's information, the request forms were mostly filled by residents, with the filled resident's name in about 93.70% and about 51.30% of the consulting staff's name. The contact physician's phone number was filled in about 31.40%.

Discussion

The radiological request forms are the important way for the communication between clinicians and radiological department personnel (radiologists, radiographers and nurses). There is not much opportunity to discuss about the clinical information and the management. The inadequate filling of the request form is a worldwide problem[7]. This study also reveals a high number of incompletely filled items in the radiological request forms in the same way as seen in the previous reports[2,7,14,20-24]. Only 0.2% of the 1,000 request forms were completely filled, without significant difference as compare to other studies (0-4%)[1,20-24].

In medical record, the patient's biodata is necessary for the patient identification. Incorrect or absent data may lead to the serious error in the patient identification. The biodata serves as a guide for the radiologist to select appropriate radiological investigation and limitation of unnecessary radiation exposure[18]. Name, age, hospital number were 100% completely filled, slightly different from other studies that the name was filled in about 80-100%[1,16-22,28], 44-98% for age[1,16-25,28,] 71% for hospital number[17]. This difference is partly due to the use of the sticker in this study which contains biodata set such as hospital number, patient name, age, sex that was printed directly from the hospital information system. The use of the sticker is not only excellent for completing data filling but also excellent for correcting illegible problem that may lead to various big problems. The fault could be due to mismatch, patching the sticker on the incorrect request form and outdated data.

The phone number of the patient or the relative was filled in only 3.41%, similar to the previous reports (0-10%)[1,19,22]. Few incomplete request forms of the group could be the patients in the emergency unit or inpatient department. For the unconscious patients, the important information should be got from the relatives.

The data of the last menstrual period of the reproductive females are helpful in determining the risk of existing pregnancy which could face the danger of the radiation exposure, especially the computed tomography. LMP is one of the files that commonly ignored 13, only 2.1-51%[17,19-20] was filed in the previous studies, similar to 18.86% of this study.

The ward in charge of the patient is important in identifying and recalling the patient if want to repeat or perform additional examination. It enables locating the patient and eliciting more information about the patient, attending clinician, to get more information about clinical information, severity of the illness and to consider necessary adjustment in radiological investigation or CT protocol. The rate of filling the ward data is about 53.7%, similar to 43-92%[16-20,25] of the previous studies.

For clinical data, the patient's consciousness and ventilation status were not filled in about 64.2% of the request forms. The patient's status is important data for radiographer to select properly the appropriate technique20and proper investigation method.

The renal function is documented in about 55.3% of total request forms and about 90% of the request form for contrast enhanced CT scan. The renal function is correlated with the contrast medium induced nephropathy which is one of the leading causes of the hospital-acquired acute kidney injury. This study shows better rate of filling renal function in the request forms, 55.3%, as compared with the previous study (1.5%)[22].

Adequate clinical information is associated with accurate radiological report and inadequate clinical information increases the level of the inaccurate radiological report, resulting in direct effect on the patient's management[28]. The reason and the justification for the investigation should be indicated in the request form[27]. The clinical information and clinical diagnosis are provided in about 99.7% and 95.2% respectively. The clinical information was filled in about 18.92% in the previous studies without significant difference as compared with this study. The Royal College of Radiologists has recommended that all radiological request forms should include the referring clinician's question to justify radiation exposure and increases the accuracy of the differential diagnosis. Various percentages of asking a specific question in radiological request forms were noted in the previous studies (1.4-90%)[1,21,23,29]. The column for the clinical diagnosis in this study cannot replace the specific question completely.

About 96.7% of the request forms still lacks of the information about mobility status, the previous operation, as compared with 79.3% of the previous study[20]. Previous operations give the information for the radiologist to select the study method, technique and finding interpretation, due to anatomical change. The mobility status is important for the radiographer to select the equipment and the technique proper to the patient's condition.

About 6.92% of the request forms was illegible. This illegible handwriting problem is better than the previous study (7.37%)[19], Illegible handwriting leads to the lack of understanding of the request and the wrong interpretation, the delayed time to communicate with the clinician for the clarification of the data[21]. The filling of the request form is handwriting, not computerized, so illegibility is still the problem similar to non-filling data.

About 60.8% of the information on the previous CT examination and about 45.8% of the history of allergy were filled in the request forms. The previous x-ray exposure is important to limit the exposure beyond the recommended dose. The previous examination may be required for the comparison to determine the progression of a clinical condition

The examined parts on the request forms were completely filled in about 99.7%, similar to the previous studies[17-21].

For clinician's data. The name of the resident or primary physician, consulting staff, physician's phone number, about 93.7%, 51.3%, and 31.4% respectively, were filled.

In training institutes, the consultant in charge of the patient and the resident physician working with the consultant are important[22].

The name of the consultant in charge was filled in 51.3% of the request form, in this study lower than 83.1- 99.7%1,[16-28] of the previous study.

The clinician's name, phone number are necessary for contacting the physician and eliciting more information about the patient and for giving feedback, especially in case of urgent attention to patient's condition. In this era of GSM (global System for mobile Communication) which make communication easy, all medical requests should include clinician's phone number for the easy communication20. Not only missing names, illegible names are also the most common problem in request forms (1.3-40%).[16-18]

The clinical audit is a systemic review and analysis of the current practice in comparison to the standard in order to improve the quality of the care by implementing the relevant change[26]. The regular audit is suggested for improving the quality. Regular workshops should be held to enlighten the referring physicians, especially those newly employed, on the importance of all the items in the request forms. Subsequently incomplete or unconventional request forms should be rejected at the radiology department to enforce the standard practice[19]. No standard format for radiological request form is available. Different organizations use their own personalized version[6,7].

Nowadays increased implementation of electronic based medical record as well as electronic based imaging form is noted. Electronic-based forms show a higher percentage of form completion, enhanced legibility and elimination of the unclear information.

Conclusion

Radiological request forms are still inadequately, incompletely filled in high percentage of the cases. Further solving of the problem is recommended such as periodic audit request form, electronic or computerized based request form or adjustment to new and standardized request form.

References

1. Akinola R, Wright K, Orogbemi O. Radiology request forms: are they adequately filled details supplied by the referring clinician while mobility by clinicians?. The Internet Journal of Radiology 2010; 12: 1.
2. Oswal D, Saphersonb D, Rehmanc A. A study of adequacy of completion of radiology request forms; An International Journal of Diagnostic Imaging and Radiation Therapy 2009; 15: 209-213.
3. Mohammed OY, Caroline EAE, Abdelmoneim S. Evaluation of Radiology Request Forms in Diagnostic Centres in Khartoum, Sudan. Sudan Medical Monitor 2011; 6: 201-210.
4. Royal College of Radiologists. iRefer: RCR referral Guidelines 8th Edition London: RCR, 2017 https://www.irefer.org.uk/guidelines/about-guidelines/communication-radiology-service
5. Department of Health, UK. The Ionising Radiation (Medical Exposure) Regulations 2000, Statutory Instrument No. 1059. London: HMSO; 2000.
6. Jumah KB, Gordon-Harris L, Agahowa JI. Common faults in filling of the radiology request forms. East Afr Med J 1995; 72: 744-5.
7. Agwu KK, Okoye IJ. Audit of Radiological requests at the University of Nigeria Teaching Hospital, Enugu. Nigerian Quarterly, Journal of Hospital Medicine 2005; 15: 67-71.
8. Siewert B, Raptopoulos V, Mueller MF, Rosen MP, Steer M. Impact of CT on diagnosis and management of acute abdomen in patients initially treated without surgery. AJR Am J Roentgenol 1997; 168:173–8.
9. Reginelli A, Russo A, Pinto A, Stanzione F, Martiniello C, Cappabianca S, et al. The role of computed tomography in the preoperative assessment of gastrointestinal causes of acute abdomen in elderly patients. Int J Surg 2014; 12:181–6.
10. Chin JY, Goldstraw E, Lunniss P, Patel K. Evaluation of the utility of abdominal CT scans in the diagnosis, management, outcome and information given at discharge of patients with non-traumatic acute abdominal pain. Br J Radiol 2012; 85:596–602.
11. Morrison I, McLaughlin PM, Maher M. Current status of imaging of the gastrointestinal tract: imaging techniques and radiation issues. In: Adam A, Dixon A, Gillard J, et al. (eds) Grainger & Allison's Diagnostic Radiology: A Textbook of Medical Imaging, 6th ed. New York, NY: Churchill Livingstone Elsevier; 2015. p.607–9.
12. Pandharipande PV, Reisner AT, Binder WD, Zaheer A, Gunn ML, Linnau KF, et al. CT in the Emergency Department: A Real-Time Study of Changes in Physician Decision Making. Radiology 2016; 278:812-21.
13. Dhingsa R, Finlay DB, Robinson GD, Liddicoat AJ. Assessment of agreement between general practitioners and radiologists as to whether a radiation exposure is justified. Br J Radiol 2002; 75:136-239.
14. Triantopoulou Ch, Tsalafoutas I, Maniatis P, Papavdis D, Raios G, Siafas I, et al. Analysis of radiological examination request forms in conjunction with justification of X-ray exposures. Eur J Radiol 2005; 53: 306-11.
15. Berbaum KS, el-Khoury GY, Franken EA Jr, Kathol M, Montgomery WJ, Hesson W, et al. Impact of clinical history on fracture detection with radiography. Radiology 1988; 168: 507- 11.
16. Depasquale R, Crockford MP. Are radiology Request forms adequately filled in? An audit assessing local practice. Malta Medical Journal 2005; 17: 1-5.
17. Mathew G A, Chigozie N I, Aisha W, Dlama ZJ, Geofrey L, Abasiama O, et al. Evaluation of the Adequacy of Completion of Radiology Request Forms in a Tertiary Hospital, Northeast, Nigeria. The Pacific journal of Science and Technology 2015; 16:2.
18. Duncan K, Barter S.Clinical Information from A&E.Adequacy of clinical information from accident and emergency (A&E) Department. The Royal College of Radiologists; 2008.
19. Irurhe NK, Sulaymon FA, Olowoyeye OA, Adeyomoye AA. Compliance rate of adequate filling of radiology request forms in a Lagos university teaching hospital. World J Med Sci 2012; 7:10 2.
20. Akintunde AO, Ikpeme AA, Afiong IN, Nch ie w e EA, Udofia AT. An audit of the completion of radiology request forms and the request practice. J Family Med Prim Care. 2015; 4930: 328-30.
21. Onwuchekwa RC, Maduforo CO. Analysis of the Adequacy of Radiological Request From completion: A Multicentre Evaluation.Pakistan J of Radiology. 2017; 27:233-8.
22. Hamaira An, Hassain Ah. Are The CT Request Forms Adequately Filled. Pakistan J of Radiology 2016; 26:179-82.
23. Mohammad H, Iortile JT, Ogbeifun O.J, Ikubor JE. An Assessment of The adequacy of Filling of Radiology Request Cards in A teraching Hospital in Makurdi, North Central Nigeria. JOSR Journal of Dental and Medical science 2016; 15: 71-4.
24. Adebayo SB, Awosanya GO, Balogun BO, Osibogun A. Multicentre assessment of radiology request form completion in south west Nigeria. Nigerian Hospital Practice Journal 2009; 3:12 3.
25. Hopkins A. Clinical audit: time for reappraisal? J R Coll Physicians Lond 1996; 30: 415-25.
26. Rajanikanth Rao V. Audit of radiology request forms -" Are they adequately filled?" J Med Sci Res 2014; 2: 41-4.
27. Cohen MD, Alam K. Radiology clinical synopsis: a simple solution for obtaining an adequate clinical history for the accurate reporting of imaging studies on patients in intensive care units. Pediatr Radiol 2005; 35: 918-22.
28. Afolabi OA, Fadare JO, Essien EM. Audit of completion of radiology request form in a Nigerian specialist hospital. Ann Ib Postgrad Med 2012; 10: 48-52.
29. Yahya Al Mu, Majed Al Do, Mowafa Ho, Basema Sa. Auditing The Completerness and Legibility of Compueterized Radiological Request Forms. J Med Syst 2017; 41:199.