عن عائشة رضي الله عنها قالت :قال رسول الله صلى الله عليه وسلم :

"ان الله يحب اذا عمل احدكم عملا ان يتقنه "

اخرجه الطبرانى

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Abstract

The request form is a way to gather information about the patients who undergo CT or any other radiological procedure .The study was to assess CT chest request form using an ideal request form and compare it to the request forms collected from different hospitals to reduce the complications which can occur with insufficient information about patient's condition.

A total number of 60 CT chest forms referred from various hospitals in Khartoum state were evaluated. The result of the study revealed that patient name, exam date, physician name, age and gender were included in the request form. Height, weight, allergy to medications, sedation, and anesthesia, requirement of special care, pregnancy, kidney dysfunction, serum creatinine and diabetes mellitus were absent. Phone number was found in 88.3% of forms, furthermore clinical data was found in 91.7% of request forms and Previous CT scan was found in 3.3% of request forms. In spite of the importance of the information included in an ideal request form, radiological departments don't imply them in their procedures.

المستخلص

طلب فحص الاشعة هو وسيلة لجمع المعلومات عن المرضى الذين سيخضعون لاجراء فحص الاشعة. في دراسة تقويم طلب فحص الاشعة المقطعية للصدر تم استخدام طلب فحص الاشعة المقطعية للصدر المعياري وتمت مقارنته بواسطة الطلبات التي تم جمعها من عدة مستشفيات داخل ولاية الخرطوم.

وقد كان الهدف الرئيسي من هذه الدراسة هو تقويم طلب فحص الاشعة المقطعية للصدر في مختلف اقسام الاشعة المقطعية لمعرفة ما اذا كان طلب فحص الاشعة المقطعية مثاليا ام لا وذلك لتقليل المضاعفات التي قد تحدث نتيجة لعدم وجود معلومات كافية عن حالة المريض. بنيت الدراسة على ٦٠ طلب فحص الاشعة المقطعية للصدر بالمستشفيات المختلفة داخل ولاية الخرطوم ووجد من خلال البحث ان اسم المريض ، تاريخ الفحص ، اسم الطبيب ، العمر والنوع موجود بنسبة ١٠٠% والطول ،والوزن ، الحساسية للعقاقير ، المهدئات ، التخدير ومتطلبات العناية الخاصة ، الحمل ، وظائف الكلى ، مرض السكري غير موجودة بنسبة ١٠٠%. اما رقم الهاتف وجد بنسبة ٨٨,٣% ، والمعلومات السريرية بنسبة ٩١,٧% ، وفحوصات الاشعة المقطعية للصدر السابقة بنسبة ٣,٣ %. على الرغم من اهمية المعلومات المذكورة في طلب فحص الاشعة المعياري ، الا ان اقسام الاشعة لا تقوم بتطبيقه عند اجراء فحص الاشعة المقطعية للصدر.

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List of abbreviations

Abbreviation	The term
CT	Computed tomography
CAT	Axial Computed tomography
ACR	American College of Radiology
SPR	Society for Pediatric Radiology
SCBT-MR	Society of Computed Body Tomography and Magnetic Resonance
PACS	picture archiving and communication system
MIPs	maximum-intensity projections
DFOV	display field of view
ALARA	as low as reasonably achievable
GFR	Glomerular filtration rate
MDRD	Modification of Diet in Renal Disease
ICM	Iodinated Contrast Media

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Chapter one

Introduction

1.1 Introduction:

Computed tomography, more commonly known as a CT or CAT scan, is a diagnostic medical test that, like traditional x-rays, produces multiple images or pictures of the inside of the body. The cross-sectional images generated during a CT scan can be reformatted in multiple planes, and can even generate three-dimensional images. These images can be viewed on a computer monitor, printed on film or transferred to a CD or DVD.CT images of internal organs, bones, soft tissues and blood vessels typically provide greater detail than traditional x-rays, particularly of soft tissues and blood vessels.

Using a variety of techniques, including adjusting the radiation dose based on patient size and new software technology, the amount of radiation needed to perform a chest CT scan can be significantly reduced. A low-dose chest CT produces images of sufficient image quality to detect many lung diseases and abnormalities using significantly less ionizing radiation than a conventional chest CT scan—in some cases lowering dose by 65 percent or more. Low dose chest CT is currently used clinically for detecting lung cancer and following some lung nodules. CT performed for detection of certain other diseases, such as pulmonary embolism, aortic disease, or interstitial lung diseases, may call for a somewhat higher dose, but certain dose-saving measures may still be used. There is ongoing research to lower radiation doses even further. The radiologist will decide the proper settings to be used for your scan depending on your medical problems and what information is needed from the CT scan. If your child is to have a CT scan, the proper low-dose pediatric settings should be used.

1.2 The Problems of study:

The requested examination for chest is not associated with standard request. Also CT scan for chest has high frequency and variety.

1.3 Objectives of study:

1.3.1 General objective of the study:

The general objective of this study was to assess CT chest examination request forms in order to match the standard request form for CT chest examination.

1.3.2 Specific objectives:

1. To evaluate the requested CT forms for chest in different hospitals.
2. To reduce the complications that can occur with insufficient information about patients.

1.4 overview of the study:

This study consist of five chapters; chapter one the introduction, which introduces this thesis briefly and contains general introduction, problem of study, study objectives, significance of the study and overview of the study. Chapter two contains the Practice Parameters and Technical Standards for CT chest and Ideal CT Chest Request Form Contents. Chapter three contains material and method. Chapter four contains the results. Chapter five includes discussion, conclusion and recommendations in addition to the references and appendices.

Chapter two

2.1. Practice Parameters and Technical Standards for CT chest:

This document is an educational tool designed to assist practitioners in providing appropriate radiologic care for patients. Practice Parameters and Technical Standards are not inflexible rules or requirements of practice and are not intended, nor should they be used, to establish a legal standard of care. For these reasons and those set forth below, the American College of Radiology and our collaborating medical specialty societies caution against the use of these documents in litigation in which the clinical decisions of a practitioner are called into question.[Timins et al., 2008].

The ultimate judgment regarding the propriety of any specific procedure or course of action must be made by the practitioner in light of all the circumstances presented. Thus, an approach that differs from the guidance in this document, standing alone, does not necessarily imply that the approach was below the standard of care. To the contrary, a conscientious practitioner may responsibly adopt a course of action different from that set forth in this document when, in the reasonable judgment of the practitioner, such course of action is indicated by the condition of the patient, limitations of available resources, or advances in knowledge or technology subsequent to publication of this document. However, a practitioner who employs an approach substantially different from the

guidance in this document is advised to document in the patient record information sufficient to explain the approach taken.

The practice of medicine involves not only the science, but also the art of dealing with the prevention, diagnosis, alleviation, and treatment of disease. The variety and complexity of human conditions make it impossible to always reach the most appropriate diagnosis or to predict with certainty a particular response to treatment. Therefore, it should be recognized that adherence to the guidance in this document will not assure an accurate diagnosis or a successful outcome. All that should be expected is that the practitioner will follow a reasonable course of action based on current knowledge, available resources, and the needs of the patient to deliver effective and safe medical care. The sole purpose of this document is to assist practitioners in achieving this objective .This practice parameter was revised collaboratively by the American College of Radiology (ACR), the Society of Computed Body Tomography and Magnetic Resonance (SCBT-MR), and the Society for Pediatric Radiology (SPR).

Computed tomography (CT) is a frequently used imaging modality for the diagnosis and evaluation of many thoracic diseases. Optimal performance of thoracic CT requires knowledge of normal anatomy, anatomic variants, pathophysiology, CT techniques, and the associated risks. This practice parameter outlines the principles for performing high-quality thoracic CT in adults and children.

The goal of thoracic CT is to demonstrate normal and pathologic anatomy and physiology within the chest. . [Poeppel TD et.al., 2014]

2.1.1. Indications and contraindications:

Firstly; thoracic CT may be a complementary examination to other imaging studies such as chest radiography or a stand-alone procedure. Indications for the use of thoracic CT

include, but are not limited to: Evaluation of abnormalities discovered on chest images [Marshall GB et.al 2006]. Evaluation of clinically suspected cardiothoracic pathology. Staging and follow-up of lung cancer and other primary thoracic malignancies, and detection and evaluation of metastatic disease [Aberle DR et.al2011 - UyBico SJ et.al2010].Evaluation of cardiothoracic manifestations of known extra thoracic diseases [. Garcia-Pena P et.al 2011 -Rockall AG et.al 2001]. Evaluation of known or suspected thoracic cardiovascular abnormalities (congenital or acquired), including aortic stenosis, aortic aneurysms, and dissection [Batra P et.al 2000 - McMahoan MA et.al 2010]. Evaluation of suspected acute or chronic pulmonary emboli [Araoz PA et.al 2012 – Wittram C et.al 2006]. Evaluation of suspected pulmonary arterial hypertension [Grosse C et.al 2010]. Evaluation of known or suspected congenital cardiothoracic anomalies [Berrocal T et.al 2004, Biyyam DR et.al 2010]. Evaluation and follow-up of pulmonary parenchymal and airway disease [Abbott GF et.al 2009- Sirajuddin A et.al 2009]. Evaluation of blunt and penetrating trauma [Morgan TA et.al 2010, Thoongsuwan N et.al 2005]. Evaluation of postoperative patients and surgical complications [ChhaEJ et.al 2006,krishmnam MS et.al 2007]. Performance of CT-guided interventional procedures [AhrarK et.al 2008 – ManhireA et.al 2003].Evaluation of the chest wall [Jeung My et.al 1999 – NamSJ et.al 2011]. Evaluation of pleural disease [Benamore R er.al 2008, Walker CM er.al 2012]. Treatment planning for radiation therapy [Aird EG et.al 2002,Mscelmurray J et.al 2007] and Evaluation of medical complications in the intensive care unit or other settings [Borjesson J et.al 2011,Rubinowidz A 2010].

Secondly; For more detailed evaluation of the use of CT in assessing a variety of pulmonary diseases. And thirdly; there are no absolute contraindications to thoracic CT. As with all procedures, the relative benefits and risks of the procedure should be evaluated prior to the performance of thoracic CT, with or without the administration of

intravenous iodinated contrast or oral contrast media. Appropriate precautions should be taken to minimize patient risks, including radiation exposure

2.1.2. Qualifications and responsibilities of personnel:

Physicians who supervise and interpret CT examinations should be licensed medical practitioners who have a thorough understanding of the indications for CT as well as a familiarity with the basic physical principles and limitations of the technology of CT imaging. They should be familiar with alternative and complementary imaging and diagnostic procedures and should be capable of correlating the results of these with CT findings. The physicians should have a thorough understanding of CT technology and instrumentation as well as radiation safety. Physicians responsible for CT examinations should be able to demonstrate familiarity with the anatomy, physiology, and pathophysiology of those organs or anatomic areas that are being examined. These physicians should provide evidence of training and the requisite competence to perform CT examinations successfully [Timins et al., 2008].

2.1.3. Specifications of the examination:

Firstly: The written or electronic request for a thoracic CT examination should provide sufficient information to demonstrate the medical necessity of the examination and allow for its proper performance and interpretation. Documentation that satisfies medical necessity includes 1) signs and symptoms and/or 2) relevant history (including known diagnoses). Additional information regarding the specific reason for the examination or a provisional diagnosis would be helpful and may at times be needed to allow for the proper performance and interpretation of the examination. The request for the examination must be originated by a physician or other appropriately licensed health care provider. The accompanying clinical information should be provided by a physician or

other appropriately licensed health care provider familiar with the patient's clinical problem or question and consistent with the state scope of practice requirements. (ACR Resolution 35, adopted in 2006)

Secondly: A typical CT of the thorax should include axial images from the lung apices to the posterior cost phrenic sulci usually reconstructed at ≤5 mm with both soft tissue and a high spatial frequency (lung or bone) reconstruction algorithm. Images using 1-2 mm slice thickness with a high spatial frequency reconstruction algorithm may be helpful. Sagittal and coronal reconstructions are recommended.

Thirdly: During most examinations, scans should be obtained at suspended full inspiration. Cine imaging may be appropriate for evaluating certain disease states such as tracheomalacia. Expiratory scans may be included to evaluate for abnormalities such as air-trapping. Respiratory-gated CT may be helpful in certain applications such as radiation therapy planning. Imaging should be obtained through the entire area of interest [Liao EA et. al 2011].The field of view should be optimized for each patient.

Fourthly: The examination may be conducted with or without intravenous iodinated contrast media as clinically indicated.

Fifthly: Anatomically appropriate window and level settings should be used to view the lung parenchyma, mediastinal, chest wall, and skeletal structures, and any visible portions of the lower neck and upper abdomen. Review on a PACS (picture archiving and communication system) workstation facilitates evaluation of many studies, particularly those with large data sets. Multiplanar viewing is encouraged to facilitate the display of anatomy and pathology, and sliding-slab maximum-intensity projections (MIPs) are encouraged for detecting lung nodules [Gruden JFet.al 2002, Kawel N et.al 2009].

Sexily: Although many of the operations of a CT scanner are automated, a number of technical parameters remain operator-dependent. Because these parameters can significantly affect the diagnostic quality of a CT examination, the supervising physician must be familiar with the following: Radiation exposure factors (mAs, kVp), Collimation, Display section thickness for multidetector systems, Table increment or pitch, Acquisition and reconstruction field of view, Window settings (width and center), Reconstruction algorithm, filter, or kernel, Image reconstruction interval or increment, Detector configuration for multidetector systems, Automatic exposure control (angular and longitudinal tube current modulation) and image quality reference parameter, Radiation dose report, Reformatted images (MPR, curvilinear, Max IP, MinIP, and 3D surface or volume rendered), Reconstruction techniques such as filtered back projection or iterative reconstruction, ECG-gating, this may be helpful to reduce cardiac or aortic motion artifact[McMahon MAet.al2014].

Seventhly: Optimizing CT examination technique requires the supervising physician to select an appropriate CT protocol based on careful review of the patient history (including risk factors that might increase the likelihood of adverse reactions to contrast media) and clinical indications, as well as relevant prior imaging studies when available. This optimization process includes determining if the thoracic CT examination is clinically appropriate [Marshall GBet.al 2014].

Eighthly: Protocols may be prepared according to region of interest and clinical indication. Techniques should be selected that provide image quality consistent with the diagnostic needs of the examination at optimal radiation dose levels to answer the clinical questions posed. For each area of interest or indication, the protocol should indicate the following: If gastrointestinal contrast material is used, the volume, type, route of administration (oral or via nasogastric or other tube), and the time intervals during which

it should be delivered, If intravenous contrast material is used, the type, volume, rate of administration, and time delay between administration and scan initiation. Bolus tracking should be used whenever indicated to optimize results, Detector configuration, Pitch (table increment and feed), Slice thickness, Reconstruction interval or increment, Reconstruction kernel, algorithm, or filter,kVp and effective mAs per section as appropriate for adult or pediatric patients. With tube current modulation, a prescribed image quality with maximum and minimum mAs as appropriate for adult or pediatric patients, Noise index, noise standard deviation, quality reference mAs, or reference image (image quality reference parameter for automatic tube current modulation), Superior and inferior extent of the region of interest to be imaged, Field of view, Protocols for sending images to PACS (e.g., section thickness and plane of reformations such as coronal, sagittal, and other oblique projections), and the Medical Image Processing System as needed, 3D reconstructions where appropriate to further delineate known or suspected abnormalities, For every CT examination, the information in the radiation dose report (CTDI and dose length product) should be retained in the radiological record (such as the PACS, in a radiation dose monitoring software tool, and/or the radiology report) for reference. These protocols should be reviewed and updated annually, and dated copies should be available to appropriate physicians, radiologic technologists, medical physicists, and administrative personnel at the facility [Marshall GBet.al2014].

Nightly: For all patients, particularly pediatric patients and small adults, efforts should be directed to: Minimize radiation dose when diagnostically feasible increasing pitch, using low mA or kVp, and tightly restricting the scan range to the body region of clinical concern. While bismuth shields have been shown to reduce radiation doses, there are several disadvantages associated with their use, especially when used with automatic exposure control (tube current modulation). Other techniques exist that can provide the

same level of anterior dose reduction at equivalent or superior image quality without these disadvantages. The AAPM recommends that these alternatives to bismuth shielding be carefully considered and implemented when possible, Minimize motion artifact with short scan times (balanced against any changes in mA in order to maintain appropriate mAs), tightly restricting the scan range to the body region of clinical concern, and using appropriate sedation [Marshall GBet.al2014].

Lastly: When sedation is used, it should be administered in accordance with the ACR–SIR Practice Parameter for Sedation/Analgesia [Marshall GBet.al2014].

2.1.4. Documentation:

High-quality patient care requires adequate documentation. There should be a permanent finalized record of the CT examination and its interpretation. Images of all appropriate areas, both normal and abnormal, should be recorded in a suitable archival format. An official interpretation (final report) of the CT findings should be included in the patient's medical record regardless of where the study is performed. Retention of the CT examination should be consistent both with clinical need and with relevant legal and local health care facility requirements. (ACR Resolution 35, adopted in 2006).

2.1.5. Equipment specifications:

Firstly: Performance Guidelines to achieve acceptable clinical CT scans of the thorax, a CT scanner should meet or exceed the following capabilities: Multirow detector acquisition, Scan rotation time: ≤1 sec, Acquired slice thickness: ≤2 mm, Limiting spatial

resolution: ≥8 lp/cm for ≥32-cm display field of view (DFOV) and ≥10 lp/cm for <24 cm DFOV, Appropriate emergency equipment and medications must be immediately available to treat adverse reactions associated with administered medications. The equipment and medications should be monitored for inventory and drug expiration dates on a regular basis. The equipment, medications, and other emergency support must also be appropriate for the range of ages and sizes in the patient population [Marshall GBet.al2014].

Secondly: Images should be available on a PACS workstation for review by the radiologist. Remote viewing of images should also be available to authorized health care providers. Equipment should be capable of providing a digital means of conveying the dataset [Marshall GBet.al2014].

2.1.6. Equipment quality control:

The quality control program for CT equipment should be designed to minimize patient, personnel, and public radiation risks and to maximize the quality of the diagnostic information. The program should be supervised by a Qualified Medical Physicist. Each imaging facility should have documented policies and procedures that include: A list of tests to be performed and the frequency of performance, a List identifying which individual or group will perform the tests, A written description of the procedure that will be used for each test, including the technique factors to be employed, the equipment to be used for testing, the acceptability limits of each test, and sample records from each test, Periodic tests for CT technologists to assure that they understand CT principles and are complying with dose reduction protocols for multidetector CT imaging[Marshall GBet.al2014].

2.1.7. Radiation safety in imaging:

Radiologists, medical physicists, registered radiologist assistants, radiologic technologists, and all supervising physicians have a responsibility for safety in the workplace by keeping radiation exposure to staff, and to societyas a whole, “as low as reasonably achievable” (ALARA) and to assure that radiation doses to individual patients are appropriate, taking into account the possible risk from radiation exposure and the diagnostic image quality necessary to achieve the clinical objective. All personnel that work with ionizing radiation must understand the key principles of occupational and public radiation protection (justification, optimization of protection and application of dose limits) and the principles of proper management of radiation dose to patients (justification, optimization and the use of dose reference levels), Nationally developed guidelines, such as the ACR’s Appropriateness Criteria®, should be used to help choose the most appropriate imaging procedures to prevent unwarranted radiation exposure.

Facilities should have and adhere to policies and procedures that require varying ionizing radiation examination protocols (plain radiography, fluoroscopy, interventional radiology, CT) to take into account patient body habitus (such as patient dimensions, weight, or body mass index) to optimize the relationship between minimal radiation dose and adequate image quality. Automated dose reduction technologies available on imaging equipment should be used whenever appropriate. If such technology is not available, appropriate manual techniques should be used; Additional information regarding patient radiation safety in imaging is available at the Image Gently for children and Image Wisely® for adult’s websites. These advocacy and awareness campaigns provide free educational materials for all stakeholders involved in imaging (patients, technologists, referring providers, medical physicists, and radiologists), Radiation exposures or other dose indices should be measured and patient radiation dose estimated for representative examinations and types of patients by a Qualified Medical Physicist in accordance with the applicable ACR technical standards. Regular auditing of patient dose indices should

be performed by comparing the facility's dose information with national benchmarks, such as the ACR Dose Index Registry, the NCRP Report No. 172, Reference Levels and Achievable Doses in Medical and Dental Imaging: Recommendations for the United States or the Conference of Radiation Control Program Director's National Evaluation of X-ray Trends. (ACR Resolution 17 adopted in 2006 – revised in 2009, 2013, Resolution 52).

A Qualified Medical Physicist and radiologist together should verify that any dose reduction devices or utilities maintain acceptable image quality while actually reducing radiation dose. Dose estimates for typical examinations should be compared to reference levels described in the ACR–AAPM Practice Parameter for Diagnostic Reference Levels in Medical X-Ray Imaging.

2.1.9. Quality control and improvement, safety, infection control, and patient education:

Policies and procedures related to quality, patient education, infection control, and safety should be developed and implemented in accordance with the ACR Policy on Quality Control and Improvement, Safety, Infection Control, and Patient Education appearing under the heading Position Statement on QC & Improvement, Safety, Infection Control, and Patient Education on the ACR website (http://www.acr.org/guidelines).

For specific issues regarding CT quality control, see the ACR Practice Parameter for Performing and Interpreting Computed Tomography (CT). Equipment performance monitoring should be in accordance with the ACR–AAPM Technical Standard for Diagnostic Medical Physics Performance Monitoring of Computed Tomography (CT) Equipment [Timins et al., 2008].

1. **The ideal CT chest request form contain:**

Patient data: Exam date, Patient name and patient age; is not an important factor in and of itself. However, it should be remembered that significant illness is common among the elderly. Additionally, they may have decreased reserve that makes them less able to tolerate an adverse reaction. [B. Robbins et.al 2010] also the presence of the gender considered an effective factor that must be written by the physician especially for the female with CT chest request and for all radiation procedure because the operator must apply the 10 day rule; if patient is female to be surer there is no pregnancy. Radiation exposure for any patient is varies for ranges of Kvp and mAs which is strongly related to the patient thickness in case of Kvp in direct relationship so the presence of patient weight is consider as an important factor for CT examination in order to predict which factor can be used for the scan therefore improving the image quality and scan result.

The need for comparison of the previous patient scan and for more patient related data in case of no clinical data provided by the physician, the diagnostic radiological centers tend to request the patient phone number from the patient or from the very close relative in order to call the patient for previously mentioned reasons.

Technical data: Clinical data; to evaluate the patient indication for these investigation, and furthermore the assessing the requirement for IV iodinated contrast injection; decision should be taken upon **.**Previous CT scan to determine the imaging technique used. Also Allergy to medication and Contrast agents are indispensable in the practice of radiology**.** Nonetheless, risks associated with contrast agents have not been eliminated, and adverse reactions of varying degree continue to occur. Consequently, it is imperative for anybody administering contrast agents to be intimately familiar with the characteristics, indications, and potential side effects of these agents; severity: The American College of Radiology has divided adverse reactions to contrast agents into the following categories: Mild :Signs and symptoms appear self-limited without evidence of

progression: Nausea, vomiting Altered taste Sweats, Cough Itching Rash, hives, Warmth (heat) Pallor Nasal stuffiness, Headache Flushing Swelling: eyes, face ,Dizziness Chills Anxiety ,Shaking . Treatment: Observation and reassurance. Usually no intervention or medication is required; however, these reactions may progress into a more severe category. Moderate **:**Reactions which require treatment but are not immediately life-threatening :Tachycardia/brady cardia ,Hypotension, Bronchospasm, wheezing ,Hypertension Dyspnea Laryngeal edema ,Pronounced cutaneous Pulmonary edema reaction .Treatment: Prompt treatment with close observation .Severe: Life-threatening with more severesigns or symptoms including: Laryngeal edema, profound hypotension, Unresponsiveness (severe or progressive), Convulsions, Cardiopulmonary arrest, clinically manifest arrhythmias. Treatment: Immediate treatment. Usually requires hospitalization. Fortunately, most reactions are classified as mild. Within this category, itching, flushing, hives, nasal congestion, and swelling about the eyes and face are common. Nausea and vomiting have become less common with the use of low osmolar and iso-osmolar agents. Among the moderate reactions, bronchospasm and laryngeal edema are encountered most frequently; patients must also be monitored carefully for changes in cardiac rate and blood pressure. Severe reactions, while infrequent, can rapidly escalate to a life-threatening situation. Delayed Contrast Reactions Delayed contrast reactions can occur anywhere from 3 hours to 7 days following the administration of contrast. Since patients are generally discharged from the radiology department within 30 minutes of contrast administration, these reactions are rarely observed by the radiologist supervising the contrast administration. These events are often not brought to the attention of the radiologist since the delayed event may not be ascribed to the contrast media and these events are often self-limited. Regardless, it is important for anyone administering intravenous contrast media to be aware of delayed reactions. With the exception of contrast-induced nephropathy, the more common

reactions include a cutaneous xanthem, pruritis without urticaria, nausea, vomiting, drowsiness, and headache. While cardiopulmonary arrest has been reported, it is probably not related to newer contrast agents. Cutaneous reactions are the most frequent form of delayed contrast reaction with a reported incidence of 0.5-9%. Cutaneous reactions vary in size and presentation but are usually pruritic. For the most part, these reactions are self-limited and symptoms can be treated with corticosteroid creams. Rare cases may progress to become severe, some resembling Stevens-Johnson syndrome or a cutaneous vasculitis. Consultation with a dermatologist is appropriate for delayed cutaneous reactions. Delayed cutaneous reactions are more common in patients who have had a previous contrast reaction and in those who have been treated within the past 2 years, or are currently being treated with interleukin-2(IL-2). Due to this association, the University of Wisconsin Hospitals and Clinics screens patients for a history of IL-2 therapy. While the exact mechanism of the delayed reaction is unknown, they can recur if the same contrast medium is administered again. Therefore, it is possible that these delayed reactions are T-cell mediated. As such, prophylaxis with oral corticosteroids may not be useful**.**[B.Robbins et.al 2010].

Sedation and anesthesia: Imaging studies require patients to remain still while images are acquired; in order to obtain diagnostic-quality images, some children require deep sedation or general anesthesia**,** Fast scanning methods, combined with behavior distraction techniques, can often help children undergo imaging studies without sedation or general anesthesia Neither sedation nor general anesthesia is necessary for most children < 12 > 4 years for CT; exceptions include those with certain neurological conditions or significant developmental delay that impair their ability to lie still **.**

Requirement of special care such as lift and ambulance is important in CT chest request to give extra care according to the patients' condition**.**

Pregnancy: The exposure of a fetus to radiation is referred to as prenatal radiation exposure. This can occur when the mother's abdomen is exposed to radiation from outside her body. Also, a pregnant woman who accidentally swallows or breathes in radioactive materials may absorb that substance into her bloodstream. From the mother's blood, radioactive materials may pass through the umbilical cord to the baby or concentrate in areas of the mother's body near the womb (such as the urinary bladder) and expose the fetus to radiation .The possibility of severe health effects depends on the gestational age of the fetus at the time of exposure and the amount of radiation it is exposed to. Unborn babies are less sensitive during some stages of pregnancy than others. However, fetuses are particularly sensitive to radiation during their early development, between weeks 2 and 18 of pregnancy. The health consequences can be severe, even at radiation doses too low to make the mother sick. Such consequences can include stunted growth, deformities, abnormal brain function, or cancer that may develop sometime later in life. However, since the baby is shielded by the mother's abdomen, it is partially protected in the womb from radioactive sources outside the mother's body. Consequently, the radiation dose to the fetus is lower than the dose to the mother for most radiation exposure events .Pregnant women should consult with their physicians if they have any concern about radiation exposure to their fetus [http://emergency.cdc.gov/radiation].

Kidney dysfunction (GFR): In most clinical settings, renal function is monitored by serum creatinine, which is not a sensitive marker. Creatinine is a product of muscle metabolism and is therefore proportional to muscle mass. The glomerular filtration rate (GFR) must decline by about 50 percent, to 60 mL/min, before the serum creatinine rises above 1.5 mg/dL. Thus, by the time the serum creatinine becomes abnormal, significant renal dysfunction may already be present. There is no universal agreement regarding what value of serum creatinine. Indicates significant renal insufficiency. However, a level of 1.5 mg/dL is a widely accepted figure. A cut-off below 1.5 mg/dL may classify

individuals with normal renal function, but large muscle mass, as having renal insufficiency. A cut-off greater than 1.5 mg/dL may exclude individuals who actually have renal insufficiency. A serum creatinine of greater than 1.5 mg/dL indicates renal insufficiency. GFR is a more sensitive indicator of renal function than serum creatinine alone. Because creatinine clearance, as derived from 24-hour urine collection, is a cumbersome test and has been shown to overestimate the true GFR by as much as 20% and alternative predictor of GFR is ideal. The estimated GFR (eGFR) is significantly easier to obtain as it is calculated from serum creatinine, age, gender, and ethnicity using the MDRD (Modification of Diet in Renal Disease) calculation. Additionally, eGFR has been shown to be a more accurate predictor of GFR than serum creatinine alone. With respect to G FR, moderately decreased renal function is defined as GFR 30-59, severely decreased renal function is defined as GFR 15-29 and renal failure is defined as GFR<15.

Serum creatinine: An alteration of renal function can happen in the days following the injection of Iodinated Contrast Media (ICM). This is one of the risks patients must be informed of.ICM induced nephropathy is defined by an increase in serum creatinine by more than 42 µmoles/l and/or 25%.Induced renal failure is rare in the absence of risk factors, but it affects about 20% of patients with risk factors. It is then a cause of over morbidity. The signs are an elevation of creatinineaemia and a diminution of the clearance of creatinine in the 72hours following the injection of ICM .For high-risk patients, the serum creatinine level will be measured 48 to 72 hours after the administration of ICM. In case of oliguria or a rise of more than 30% in creatinineaemia after the injection, specialist advice must be sought [Aspelin P et.al 2003].

Diabetes mellitus: Patients must stop the following medication for 48 hours after the exam; medications are Glucophage, Glucophage XR, glucovance, glumetza, metformin, alti-metformin, apo-metformin, gen-metformin, novo-metformin, nu-metformin, pms-

metformin, rho-metformin, rhoxal-metformin fc, avandamet, metaglib, riomet, glycon, byetta , janumet and fortamet .All other medication should not be stopped .Diabetes increases the risk of contrast-induced renal toxicity, even when serum creatinine is normal. The effect is magnified, however, in those patients with both diabetes and renal disease. Additionally, insulin-dependent diabetics are likely at higher risk than non-insulin-dependent diabetics. Therefore, we set a lower cutoff for the use of IV contrast in diabetics. [B. Robbins et.al 2010]

Physician data: Physician name should be included as a reference**.**

Chapter Three

Methodology

3.1. Material:

The material used for data collection was 60 copies of a preset standard CT chest request forms.

3.2. Method:

This study was aimed to evaluate the CT chest request forms using standardized request formula to assess the general requirements for this investigation that must be written or considered before the CT chest examination in Khartoum state hospitals, the data were collected from august-October 2015, all patients data and technical data was included in the CT request formula and then the assessment was done through questionnaire prepared from the standardized one to assess the presence of these variables or not then the data were analyzed in order to exclude the presence of these requirements or not.

3.2.1. Study area:

The data has been collected from several hospitals around state of Khartoum. These hospitals include: Al Rebat national hospital, Soba hospital, Fedail hospital, Royal scan center, Modern medical center and Ibn al haitham private hospital.

3.2.2. Study duration:

The research was conducted from august to October 2015.

3.2.3. The study population:

This study included Khartoum state population who were requested to preform CT chest examination.

3.2.4. Study sample:

This study was performed in 60 patients having CT chest request form.

3.2.5. Inclusion criteria:

All patients with indications for CT chest examination.

3.2.6. Statistical analysis:

The data was analyzed using Microsoft excel program and SPSS (Inc., Chicago, Illinois version 16).

3.2.7. Method of data collection:

The data were collected using standard CT chest request form which was used for all hospitals.

3.2.8. Variables of the study:

Exam date, Patient name, Age, Gender, Height, Weight, Phone Number, Clinical data, Previous CT scan, Allergy to medication or Contrast Media, Sedation, Anesthesia,

Requirement of special care (lift, ambulance), Pregnancy, Kidney dysfunction (GFR) (Serum Creatinine), Diabetes Mellitus and Physician Name.

3.2.9. Standard CT chest request form: CT Request form checklist:

Exam date …… ☐

Patient name…… ☐

Age ……. ☐

Gender …… ☐

Height …… ☐

Weight ……... ☐

Phone Number …… ☐

Clinical data.…… ☐

Previous CT scan …… ☐

Allergy to medication ☐ or Contrast Media ☐

Sedation …… ☐

Anesthesia ……. ☐

Requirement of special care (lift, ambulance) ……. ☐

Pregnancy …….. ☐

Kidney dysfunction: (GFR) ……... ☐

(Serum Creatinine) ☐

Diabetes Mellitus..……. ☐

Physician Name ……..…... ☐

3.2.10. Ethical issues:

1. There were official written permissions to Khartoum state diagnostic centers to take the data.

No patient data were published also the data was kept in personal computer with personal password.

Chapter four

The results

Table 4-1: showed the frequency distribution of patient data with its percentages

Patient data	Answer	Frequency	Percent
Exam Date	Yes	60	100.0
Patient name	Yes	60	100.0

Age	Yes	60	100.0
Gender	Yes	60	100.0
Weight	No	60	100.0
Height	NO	60	100.0
Phone NO	Yes	57	88.3
	No	7	11.7

Figure 4-1: bar charts demonstrate the frequency of patient phone No

Table 4-2: showed the frequency distribution of technical data with its percentages

technical data	Answer	Frequency	Percent
Clinical Data	Yes	55	91.7
	No	5	8.3
Previous CT	Yes	2	3.3
	No	58	96.7
Allergy to Medication	NO	60	100
Allergy to Contrast	Yes	18	30
	No	42	70
Sedation	No	60	100
Anesthesia	No	60	100
Special care	NO	60	100
Pregnancy	No	60	100
GFR	NO	60	100
Serum creatinine	NO	60	100
Diabetes	NO	60	100

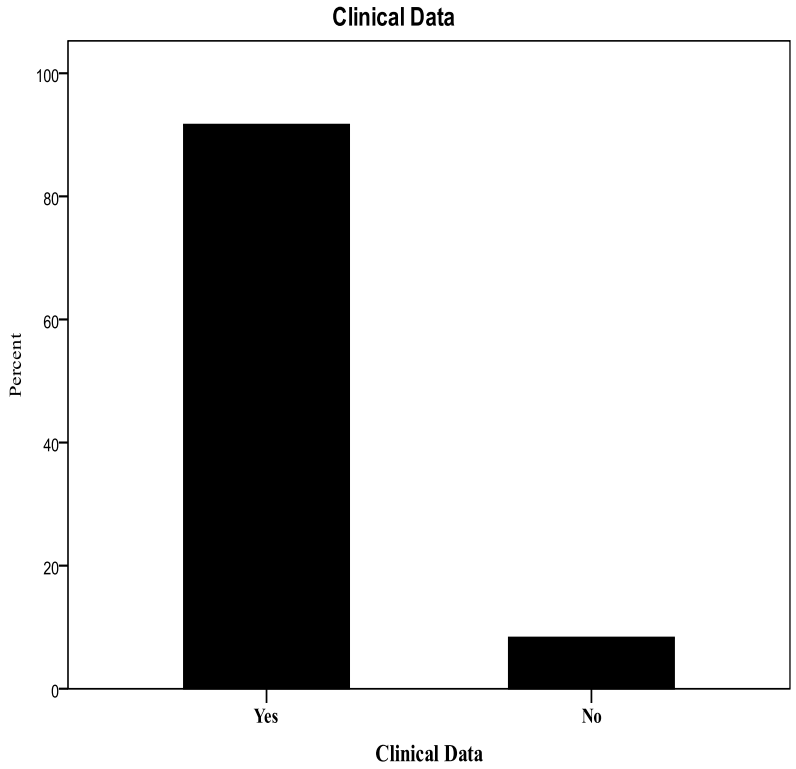
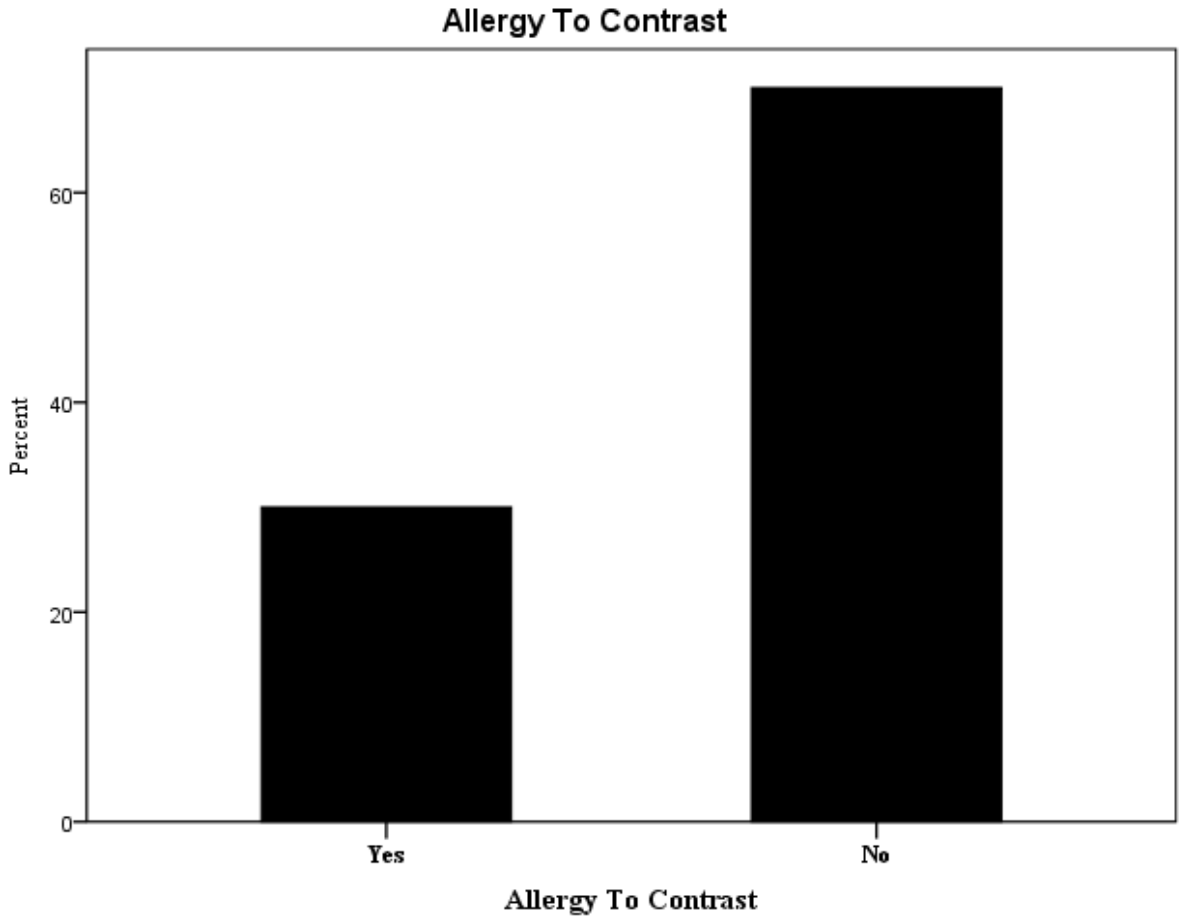


Figure 4-2**:**bar chart demonstrate the frequancy of patient clinical data

Figure 4-3bar chart demonstrate the frequancy of patient previous CT



	Answer	Frequency	Percent

Figure 4-4: bar chart demonstrate the frequency of allergy to contrast

Physician Name	Yes	60	100.0

Table 4-3 : showed the frequency distribution of physician name with its percentages

Chapter five

Discussion, Conclusion and Recommendations

5.1 Discussion:

The purpose of our research was to evaluate the CT chest request forms in Khartoum hospitals to determine if they meet the standard CT chest request form or not. This study was conducted at Khartoum state diagnostic centers and hospitals.

The ideal request form should include the following : Exam date, Patient name, Age, Gender, Height, Weight., Phone Number, Clinical data , Previous CT scan, Allergy to medication or Contrast Media, Sedation, Anesthesia, Requirement of special care (lift, ambulance), Pregnancy, Kidney dysfunction (GFR) (Serum Creatinine), Diabetes Mellitus and Physician Name.

This information is important, because the more information we have about the patient, the more accurate the diagnosis will be.

Exam date and Patient name is important to be written in all CT chest requests to be sure of patient identity .In this study 100% of the request forms (60 request forms) included the patient name and their CT chest request. Age is also important in CT chest request to determine the amount of contrast media and to adjust the exposure parameters. In this study 100% (60 request forms) identified patient age.

Gender is important to be written in all CT chest requests; the operator must apply the 10 Day Rule; if we have female patient, to be sure there is no pregnancy. In this study 100 %(60 of request forms) included gender.

Weight and Height are important to determine patient dose and amount of contrast media that will be administered. In this study 100% (60 of request forms) did not include weight and height.

Patients Phone number is important to be able to reach him for follow up. In this study 88.3 %(53 of request forms) was included the patient phone number.

Patient clinical data is important to be written in all CT requests as general in order to evaluate the patient indication for these investigations, and furthermore to assess the requirement for IV iodinated contrast injection; decision should be taken upon. In this study 91.7% (55 of request forms) included the clinical data.

Previous CT scan checkup is important to determine the imaging technique used. In this study 3.3 % (2 of request forms) of the request forms included the Previous CT scan.

Allergy to Medications is important to prevent the allergic reactions during the procedure. In this study 100% (60 of request forms) have not mentioned patient's allergy to medication in their request for CT chest.

Allergy to contrast media is important to be written in all CT chest requests to prevent the reactions during the procedure. In this study 30 % (18 request forms) from the request form was included the allergy to contrast media.

Sedation and anesthesia are important to be written in all CT chest requests for pediatrics and anxious patients .In this study 100 % of request forms had no sedation and anesthesia information in their request for CT chest.

Requirement of special care such as lift and ambulance is important in CT chest request to give extra care according to the patients' condition. In this study all request forms did not give an idea about requirement of special care in their request forms for CT chest.

Pregnancy check is important because it is a major contraindication due to the high radiation dose to the pregnant and the operator must apply the 10 day rule to make sure there is no pregnancy. In this study all CT chest request forms did not include statement about the pregnancy.

Kidney dysfunction GFR and the serum creatinine lab tests in addition to diabetes mellitus are important because patient with high creatinine level may have renal failure. And patients with insufficient kidneys will not be able to excrete the contrast media from their bodies. In this study all CT chest request forms have no GFR, serum creatinine and diabetes mellitus results.

5.2. Conclusion:

In our research we found that exam date, patient name, gender, age, and physician name were included in all the request forms.

Most of the request forms included the clinical data and phone number. On the other hand allergy to contrast media and previous CT scan were rarely found in the request forms.

Diabetes, creatinine and GFR, pregnancy, special care, anesthesia, sedation, and allergy to medication, height and weight were never found in the request forms.

5.3. Recommendations:

Recommend through our research that:

2. CT departments should issue one standard CT chest request that should be applied by all the hospitals, in order to enhance the CT procedures for better diagnosis and for more care of patient.

3. All doctors must follow the standard CT request carefully before referring the patient to the CT department.

4. Finally we recommend that all departments should not accept patients with incomplete CT chest request form.

5.4. References:

Abbott GF, Rosado-de-Christenson ML, Rossi SE, Suster S. Imaging of small airways disease. J Thorac Imaging 2009; 24:285-298.

Aberle DR, Adams AM, Berg CD, et al. Reduced lung-cancer mortality with low-dose computed tomographic screening. N Engl J Med 2011;365:395-409.

Ahrar K, Wallace M, Javadi S, Gupta S. Mediastinal, hilar, and pleural image-guided biopsy: current practice and techniques. SeminRespirCrit Care Med 2008;29:350-360.

Aird EG, Conway J. CT simulation for radiotherapy treatment planning. Br J Radiol2002; 75:937-949.

Araoz PA, Haramati LB, Mayo JR, Barbosa EJ, Jr., Rybicki FJ, Colletti PM. Panel discussion: pulmonary embolism imaging and outcomes. AJR 2012;198:1313-1319.

Aspelin P, Aubry P, Fransson SG, Strasser R, Willenbrock R, Berg KJ; Nephrotoxicity in High-Risk Patients Study of IsoOsmolar and Low-Osmolar Non-Ionic Contrast Media Study Investigators. Nephrotoxic effects in high-risk patient undergoing angiography. N Engl J Med 2003;6;348:491-9

Batra P, Bigoni B, Manning J, et al. Pitfalls in the diagnosis of thoracic aortic dissection at CT angiography. Radiographics2000;20:309-320.

Benamore R, Warakaulle DR, Traill ZC. Imaging of pleural disease.Imaging 2008:236-251.

Benamore RE, Scott K, Richards CJ, Entwisle JJ. Image-guided pleural biopsy: diagnostic yield and complications. Clin Radiol2006; 61:700-705.

Berrocal T, Madrid C, Novo S, Gutierrez J, Arjonilla A, Gomez-Leon N. Congenital anomalies of the tracheobronchial tree, lung, and mediastinum: embryology, radiology, and pathology. Radiographics2004;24:e17.

Biyyam DR, Chapman T, Ferguson MR, Deutsch G, Dighe MK. Congenital lung abnormalities: embryologic features, prenatal diagnosis, and postnatal radiologic-pathologic correlation. Radiographics2010;30:1721-1738.

Borjesson J, Latifi A, Friman O, Beckman MO, Oldner A, Labruto F. Accuracy of low-dose chest CT in intensive care patients. EmergRadiol2011;18:17-21.

Castaner E, Gallardo X, Ballesteros E, et al. CT diagnosis of chronic pulmonary thromboembolism. Radiographics2009;29:31-50; discussion 50-33.

Chae EJ, Seo JB, Kim SY, et al. Radiographic and CT findings of thoracic complications after pneumonectomy. Radiographics2006;26:1449-1468.

Chao CP, Walker TG, Kalva SP. Natural history and CT appearances of aortic intramural hematoma. Radiographics2009;29:791-804.

Galvin JR, Franks TJ. Smoking-related lung disease. J Thorac Imaging 2009;24:274-284.

Garcia-Pena P, Boixadera H, Barber I, Toran N, Lucaya J, Enriquez G. Thoracic findings of systemic diseases at high-resolution CT in children. Radiographics2011;31:465-482.

Ghaye B, Ghuysen A, Bruyere PJ, D'Orio V, Dondelinger RF. Can CT pulmonary angiography allow assessment of severity and prognosis in patients presenting with pulmonary embolism? What the radiologist needs to know. Radiographics2006;26:23-39; discussion 39-40.

Grosse C, Grosse A. CT findings in diseases associated with pulmonary hypertension: a current review. Radiographics2010;30:1753-1777.

Gruden JF, Ouanounou S, Tigges S, Norris SD, Klausner TS. Incremental benefit of maximum-intensity-projection images on observer detection of small pulmonary nodules revealed by multidetector CT. AJR 2002;179:149-157.

Hansell DM, Bankier AA, MacMahon H, McLoud TC, Muller NL, Remy J. Fleischner Society: glossary of terms for thoracic imaging. Radiology 2008;246:697-722. Jessica B. Robbins, MD Myron A. Pozniak, MD For questions, comments, or permission to use any or all of this tutorial, please contact Myron Pozniak MD at mpozniak@uwheath.orgor 608/263-8312 University of Wisconsin, Departmentof Radiology, Madison, WI ©2010

Jeung MY, Gangi A, Gasser B, et al. Imaging of chest wall disorders. Radiographics1999;19:617-637.

Kawel N, Seifert B, Luetolf M, Boehm T. Effect of slab thickness on the CT detection of pulmonary nodules: use of sliding thin-slab maximum intensity projection and volume rendering. AJR 2009;192:1324-1329.

Krishnam MS, Suh RD, Tomasian A, et al. Postoperative complications of lung transplantation: radiologic findings along a time continuum. Radiographics2007;27:957-974.

Kim KI, Kim CW, Lee MK, et al. Imaging of occupational lung disease. Radiographics2001;21:1371-1391.

Klein JS, Schultz S, Heffner JE. Interventional radiology of the chest: image-guided percutaneous drainage of pleural effusions, lung abscess, and pneumothorax. AJR 1995;164:581-588.

Leung AN, Bull TM, Jaeschke R, et al. An official American Thoracic Society/Society of Thoracic Radiology clinical practice guideline: evaluation of suspected pulmonary embolism in pregnancy. Am J RespirCrit Care Med 2011;184:1200-1208.

Lynch DA. Lung disease related to collagen vascular disease. J Thorac Imaging 2009;24:299-309.

Levine BD, Motamedi K, Chow K, Gold RH, Seeger LL. CT of rib lesions. AJR 2009;193:5-13.

Liao EA, Quint LE, Goodsitt MM, Francis IR, Khalatbari S, Myles JD. Extra Z-axis coverage at CT imaging resulting in excess radiation dose: frequency, degree, and contributory factors. J Comput Assist Tomogr2011;35:50-56.

Marshall GB, Farnquist BA, MacGregor JH, Burrowes PW. Signs in thoracic imaging. J Thorac Imaging 2006;21:76-90.

Mayberry JP, Primack SL, Muller NL. Thoracic manifestations of systemic autoimmune diseases: radiographic and high-resolution CT findings. Radiographics2000;20:1623-1635.

Marchiori E, Franquet T, Gasparetto TD, Goncalves LP, Escuissato DL. Consolidation with diffuse or focal high attenuation: computed tomography findings. J Thorac Imaging 2008;23:298-304.

McMahon MA, Squirrell CA. Multidetector CT of Aortic Dissection: A Pictorial Review. Radiographics2010;30:445-460.

Morgan TA, Steenburg SD, Siegel EL, Mirvis SE. Acute traumatic aortic injuries: posttherapymultidetector CT findings. Radiographics2010;30:851-867.

Manhire A, Charig M, Clelland C, et al. Guidelines for radiologically guided lung biopsy. Thorax 2003;58:920-936.

McElmurray J, Lu B, Duggan D, Diaz R, Delbeke D. The impact of 18F-FDG PET/CT imaging on radiation treatment planning for patients with non-small cell lung cancer. J Nucl Med 2007.

Nam SJ, Kim S, Lim BJ, et al. Imaging of primary chest wall tumors with radiologic-pathologic correlation. Radiographics2011;31:749-770.

Nguyen ET, Silva CI, Souza CA, Muller NL. Pulmonary complications of illicit drug use: differential diagnosis based on CT findings. J Thorac Imaging 2007;22:199-206.

Pahade JK, Litmanovich D, Pedrosa I, Romero J, Bankier AA, Boiselle PM. Quality initiatives: imaging pregnant patients with suspected pulmonary embolism: what the radiologist needs to know. Radiographics2009;29:639-654.

Poeppel TD, Krause BJ, Heusner TA, Boy C, Bockisch A, Antoch G. PET/CT for the staging and follow-up of patients with malignancies. Eur J Radiol2009;70:382-392.

Pipavath SN, Schmidt RA, Takasugi JE, Godwin JD. Chronic obstructive pulmonary disease: radiology-pathology correlation. J Thorac Imaging 2009;24:171-180.

Rubinowitz A, Smitaman E, Mathur M, Siegel M. Thoracic Radiology in the ICU. PCCSU 2010.

Rockall AG, Rickards D, Shaw PJ. Imaging of the pulmonary manifestations of systemic disease. Postgrad Med J 2001;77:621-638.

Schoepf UJ, Costello P. CT angiography for diagnosis of pulmonary embolism: state of the art. Radiology 2004;230:329-337.

Schuster ME, Fishman JE, Copeland JF, Hatabu H, Boiselle PM. Pulmonary embolism in pregnant patients: a survey of practices and policies for CT pulmonary angiography. AJR 2003;181:1495-1498.

Silva CI, Muller NL. Idiopathic interstitial pneumonias. J Thorac Imaging 2009;24:260-273.

Sirajuddin A, Kanne JP. Occupational lung disease. J Thorac Imaging 2009;24:310-320.

Thoongsuwan N, Kanne JP, Stern EJ. Spectrum of blunt chest injuries. J Thorac Imaging 2005;20:89-97.

UyBico SJ, Wu CC, Suh RD, Le NH, Brown K, Krishnam MS. Lung cancer staging essentials: the new TNM staging system and potential imaging pitfalls. Radiographics2010;30:1163-1181.

Wittram C, Maher MM, Yoo AJ, Kalra MK, Shepard JA, McLoud TC. CT angiography of pulmonary embolism: diagnostic criteria and causes of misdiagnosis. Radiographics2004;24:1219-1238.

Wittram C, Kalra MK, Maher MM, Greenfield A, McLoud TC, Shepard JA. Acute and chronic pulmonary emboli: angiography-CT correlation. AJR 2006;186:S421-429.

Walker CM, Takasugi JE, Chung JH, et al. Tumorlike conditions of the pleura. Radiographics2012; 32:971-985.

5.5. Appendices:

PROPOSED MODEL OF IDEAL CT CHEST REQUEST FORM

- Patient name:.....
- Exam date : .....
- Age : .....
- Gender :.....
- Height : .....
- Weight : .....
- Phone Number : .....
- Clinical data .....

  .....
- GFR : .....
- Serum Creatinine : .....
- Physician Name : .....

- Previous CT scan :

  Yes: ◯ No: ◯
- Allergy to medication or Contrast Media :

  Yes: ◯ No: ◯
- Sedation or Anesthesia :

  Yes : ◯ No : ◯
- Pregnancy :

  Yes : ◯ No : ◯
- Diabetes Mellitus :

  Yes : ◯ No : ◯

التاريخ: .....

الاسم: [redacted]

العمر: .....

Rx:

مركز ابن الهيثم

امام مجلس التخصصات الطبية

شارع حوادث الخرطوم

ك: Chronic Cough.

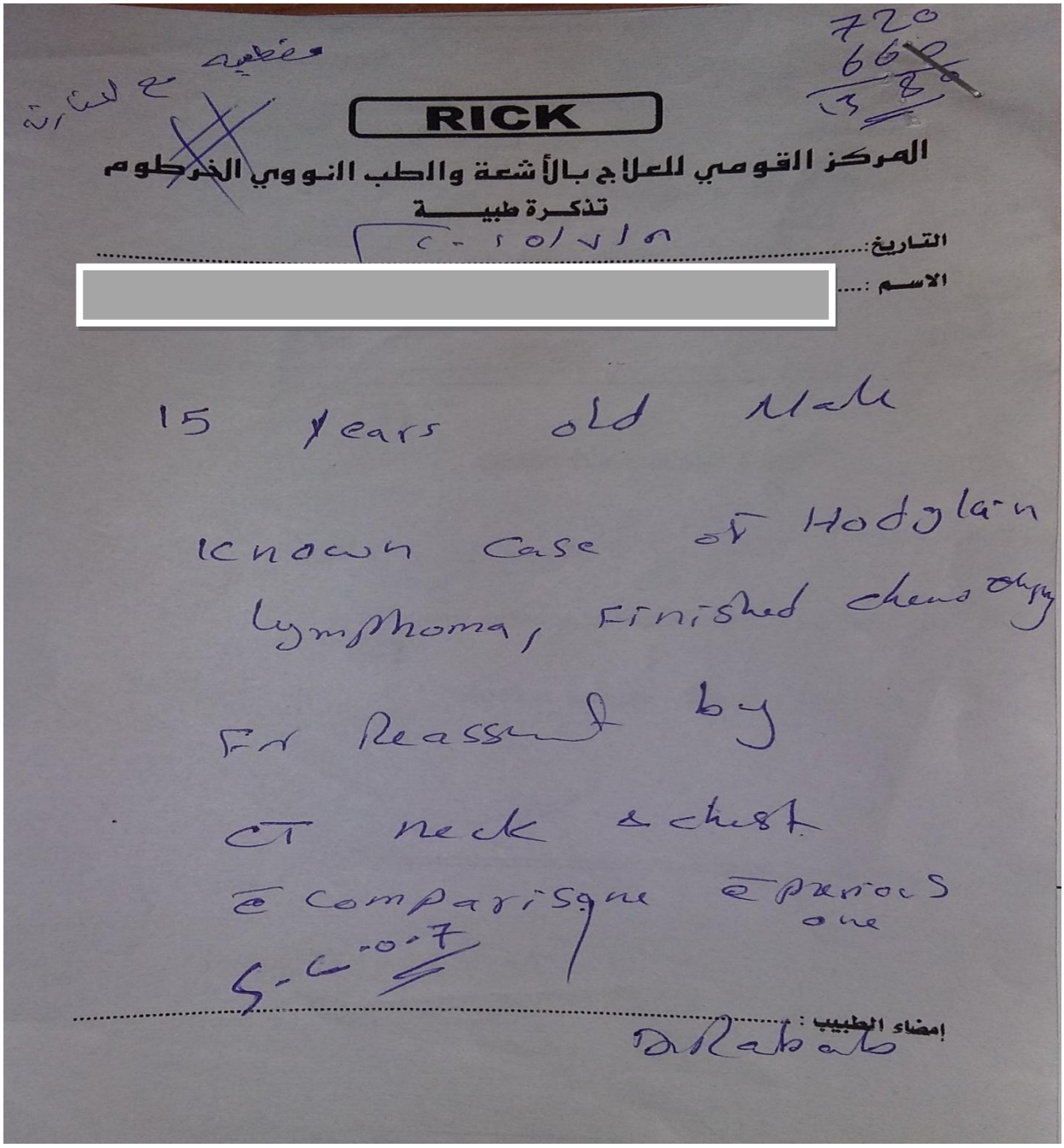
Loss of weight.

chest Xray. Show ill defined mass Rt lower Zone (posteriorly)

Pan C.T. chest.

Doctor .....

الطبيب .....



RICK

المركز القومي للعلاج بالأشعة والطب النووي الخرطوم

تذكرة طبية

التاريخ: ٢٠١٥/٧/٥

الاسم: [redacted]

15 Years old Male

Known Case of Hodgkin lymphoma, Finished chemotherapy

For Reassessment by

CT neck & chest

& comparison & Previous one

5-6-07

إمضاء الطبيب: Dr Rabab

Royal Scan Center

معلومات المريض و معلومات أمر الشغل

الأسم : [redacted]

النوع : M

التليفون 0991188761

رقم أمر الشغل 80570

موظف الأستقبل هديل زين العابدين محمد

رقم المريض 80656

رقم الفحص K91472

السن 8 Year(s)

العنوان 0

التاريخ 10/08/2015 03:18:57 PM

CT (1)

الفحص Chest Without Contrast CT

الجهة

الطبيب المعالج

ملحوظات

سعر الفحص	600
المدفوع	600
الخصم	0
سبب الخصم	
الباقى	

clinical data

خالص

Raw materials consumption

Type	Films	Syringes	contrast	Drug items
Quantity+lost				

فى حاله استلام المريض للاشعه بدون تقرير برغبته يسقط حقه فى المطالبه بالتقرير اذا كان هذا الطلب بعد سبعه ايام من تاريخ عمل الاشعه

جامعة الخرطوم
مستشفى سوبا الجامعي
روشتة دواء

التاريخ : 18/11/2015 م

اسم المريض : [redacted]

الوحدة : Nursery ICU.

التشخيص : age :- 42 ~~etd~~ day baby, term, out come of ELCLS due to Polyhydramance, cried immedity, presented ē frequent of secreation from nose and mouth, we did Frequent chest xray 1st one, Rt upper Labor collapse put on Antibiotic +I.v fluied + O2 then do serial chest xrey last one was normal, but is still there is secreation

Plan For

Chest CT scan + neck please. CT scan

اسم الطبيب : د. وسيم أحمد ..... الامضاء : .....

اسم الصيدلي : ..... الختم .....

بسم الله الرحمن الرحيم

Fedail Hospital

مستشفى فضيل

قسم الأشعة والتصوير الطبى

Imaging & Isotope Scan Department

Imaging Request

تلفون رقم

غرفة رقم

Date

Patient's Name [redacted] Age ....

Service Requested

☐ X-Ray ☐ US ☐ Doppler ☐ ECHO ☐ ECG ☐ CT.Scan

☐ MRI ☐ Bone Scan ☐ Mammogram ☐ Gamma Scan

Clinical Information

c/o productive cough whitish ① yr

History of Laprotomy 2 yrs ago ?? Mass ??

Rt chest pain

Investigation Requested

Rx Chest-Abd

CT-Scan

Other Medical Problems : D.M.LMS

Name Of Referring Doctor

Sign. Dr MASOZ

مستشفى فضيل – شارع مستشفى الخرطوم – تلفون : ٧٨٠٦٧٨ – ١٨٣ – فاكس : ٧٦٦٦٦٩ – ١٨٣ ص.ب : ٣١١ الخرطوم

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960

600