stimulated luminescent dosimeters (OSLDs) were inserted into the uterus in order to approximate fetal doses. **Results:** In the pulmonary embolism CT protocol, the uterus is outside of the primary beam, and the dose to the uterus was under 1 mGy. In the trauma and appendicitis protocols, the uterus is in the primary beam, the fetal dose estimates were 30.5 mGy for the trauma protocol, and 20.6 mGy for the appendicitis protocol. Iterative reconstruction reduced fetal doses by 30%, with uterine doses at 21.3 for the trauma and 14.3 mGy for the appendicitis protocol. **Conclusion:** Fetal doses were under 1 mGy when exposed to scatter radiation, and under 50 mGy when exposed to primary radiation with the trauma and appendicitis protocols. Consistent with the National Council on Radiation Protection & Measurements (NCRP) and the International Commission on Radiological Protection (ICRP), these doses exhibit a negligible risk to the fetus, with only a small increased risk of cancer. Still, CT scans are not recommended during pregnancy unless the benefits of the exam clearly outweigh the potential risk. Furthermore, when possible, pregnant patients should be examined on CT scanners equipped with iterative reconstruction in order to keep patient doses as low as reasonable achievable.

SU-F-I-37

How Fat Distribution and Table Height Affect Estimates of Patient Size in CT Scanning: A Phantom Study

M Silosky*, R Marsh University of Colorado School of Medicine, Aurora, CO

Purpose: Localizer projection radiographs acquired prior to CT scans are used to estimate patient size, affecting the function of Automatic Tube Current Modulation (ATCM) and hence CTDIvol and SSDE. Due to geometric effects, the projected patient size varies with scanner table height and with the orientation of the localizer (AP versus PA). This study sought to determine if patient size estimates made from localizer scans is affected by variations in fat distribution, specifically when the widest part of the patient is not at the geometric center of the patient. **Methods:** Lipid gel bolus material was wrapped around an anthropomorphic phantom to simulate two different body mass distributions. The first represented a patient with fairly rigid fat and had a generally oval shape. The second was bell-shaped, representing corpulent patients more susceptible to gravity's lustful tug. Each phantom configuration was imaged using an AP localizer and then a PA localizer. This was repeated at various scanner table heights. The width of the phantom was measured from the localizer and diagnostic images using in-house software. **Results:** 1) The projected phantom width varied up to 39% as table height changed.2) At some table heights, the width of the phantom, designed to represent larger patients, exceeded the localizer field of view, resulting in an underestimation of the phantom width.3) The oval-shaped phantom approached a normalized phantom width of 1 at a table height several centimeters lower (AP localizer) or higher (PA localizer) than did the bell-shaped phantom. **Conclusion:** Accurate estimation of patient size from localizer scans is dependent on patient positioning with respect to scanner isocenter and is limited in large patients. Further, patient size is more accurately measured on projection images if the widest part of the patient, rather than the geometric center of the patient, is positioned at scanner isocenter.

SU-F-I-38

Patient Organ Specific Dose Assessment in Coronary CT Angiograph Using Voxellaized Volume Dose Index in Monte Carlo Simulation

Fallal Mohammadi Gh. [1] Riyahi Alam N. [1]*, Graily Gh. [1] Paydar R. [2] (1) Tehran University of Medical Scienced(TUMS), School of Medicine, Department of Nedical Physics and Biomedical Engineering, Tehran, Iran, (2) Iran University of Medical Sciences(IUMS), Allied Medicine Faculty, Department of radiation Sciences, Tehran, Iran

Purpose: Clinical use of multi detector computed tomography(MDCT) in diagnosis of diseases due to high speed in data acquisition and high spatial resolution is significantly increased. Regarding to the high radiation dose in CT and necessity of patient specific radiation risk assessment, the adoption of new method in the calculation of organ dose is completely required and necessary. In this study by introducing a conversion factor, patient organ dose in thorax region based on CT image data using MC system was calculated. **Methods:** The geometry of x-ray tube, inherent filter, bow tie filter and collimator were designed using EGSnrc/BEAMnrc MC-system component modules according to GE-Light-speed 64-slices CT-scanner geometry. CT-scan image of patient thorax as a specific phantom was voxellised with 6.25mm3 in voxel and 64x64x20 matrix size. Dose to thorax organ include esophagus, lung, heart, breast, ribs, muscle, spine, spinal cord with imaging technical condition of prospectively-gated-coronary CT-Angiography(PGT) as a step and shoot method, were calculated. Irradiation of patient specific phantom was performed using a dedicated MC-code as DOSXYZnrc with PGT-irradiation model. The ratio of organ dose value calculated in MC-method to the volume CT dose index(CTDIvol) reported by CT-scanner machine according to PGT radiation technique has been introduced as conversion factor. **Results:** In PGT method, CTDIvol was 10.6mGy and Organ Dose/CTDIvol conversion factor for esophagus, lung, heart, breast, ribs, muscle, spine and spinal cord were obtained as; 0.96, 1.46, 1.2, 3.28. 6.68. 1.35, 3.41 and 0.93 respectively. **Conclusion:** The results showed while, underestimation of patient dose was found in dose calculation based on CTDIvol, also dose to breast is higher than the other studies. Therefore, the method in this study can be used to provide the actual patient organ dose in CT imaging based on CTDIvol in order to calculation of real effective dose(ED) based on organ dose.

This work has been supported by the research chancellor of tehran university of medical sciences(tums), school of medicine, Tehran, Iran

SU-F-I-39

In Search of Infinity: Finding the Limiting Dose for An Infinite CT Scan On a Cylinder of Finite Length

D Bakalyar[1]*, (1) Henry Ford Health System, Detroit, MI

Purpose: The ICRU/TG200 phantom is a cylinder of polyethylene, 30 cm in diameter and 60 cm long. The dose h(L) in the central plane of the phantom resulting from a scan of length L increases asymptotically with increasing L to a limiting value Deq. However, even after scanning the entire length of this phantom, it is clear that the resultant dose h(60 cm) is still somewhat below the limiting value. The known behavior of h(L) provides a means for estimating the true limit. **Methods:** h(L) approaches its limiting but unknown value Deq exponentially. By estimating Deq as Deq* and plotting Deq* – h(L) as a function of L on a semi-log scale, a straight line will result only if Deq* = Deq. If not, there will be significant curvature at the end of the plotted data. Adjusting Deq* by trial-and-error or by an iterative scheme will, if done correctly, accurately determine Deq. **Results:** The log of Deq* – h(L) was plotted as a function of L using Microsoft Excel. The coefficient of determination (R-squared) was displayed and Deq* was adjusted until R-squared equaled 1. Alternatively, iteration using the Solver tool in Excel can automatically find the best estimate of Deq. The resultant values for Deq was were an increase of around 1.5% above h(60 cm) for the center and 0.8% at the periphery. **Conclusion:** The experiments show that a 60 cm phantom is long enough for the central dose to be within a couple of percentage points of what would be achieved with an infinite phantom. Though this small underestimation of Deq is of little consequence for dose estimates, an accurate determination of Deq allows for a better parameterization of continuous functions representing h(L).

SU-F-I-40

Impact of Scan Length On Patient Dose in Abdomen/pelvis CT Diagnosis

i park, J Song K Kim* Kyung Hee University, Yongin-si, Gyeonggi-do

Purpose: To analysis the impact of scan length on patient doses in abdomen/pelvis CT diagnosis of each hospital. **Methods:** Scan length of 7 hospitals from abdomen/pelvis CT diagnosis was surveyed in Korea. Surveyed scan lengths were additional distance above diaphragm and distance below pubic symphysis except for standard scan range between diaphragm and pubic symphysis. Patient dose was estimated for adult male and female according to scan length of each hospital. CT-Expo was used to estimate the patient dose under identical equipment settings (120 kVp, 100 mAs, 10 mm collimation width, etc.) except scan length. Effective dose was calculated by using tissue weighting factor of ICRP 103 recommendation. Increase rate of effective dose was calculated comparing with effective dose of standard scan range**Results:** Scan lengths of abdomen/pelvis CT diagnosis of each hospital were different. Also effective dose was increased with increasing the scan length. Generally increasing the distance above diaphragm caused increase of effective dose of male and female, but increasing the distance below pubic symphysis caused increase of effective dose of male. **Conclusion:** We estimated the patient dose according to scan length of each hospital in abdomen/pelvis CT diagnosis. Effective dose was increased by increasing the scan length because dose of organs with high tissue weighting factor such as lung, breast, testis were increased. Scan