CHAPTER FOUR

RESULTS

Table (4.1) : Dose calculation of all (males and females)

Pitch : 0.5 – 1.0

	Mean	**Median**	**STD**	**Min**	**Max**
Age	43.73	43	17.44	18	85
KV	120	120	0.00	120	120
MAs	541.67	600	132.67	250	600
CTDIvol	22.39	16.47	17.54	4.2	80.67
DLP	610.08	501.87	363.34	146.08	1555.14
ED	0.231	0.231	0.123	0.028	0.434

Table (4.2) : Dose calculation of males

	Mean	**Median**	**STD**	**Min**	**Max**
Age	45.35	45	20.26	9	85
KV	120	120	0.00	120	120
MAs	522.2	600	149.73	250	600
CTDIvol	21.6	16.47	15.92	4.2	60.32
DLP	678.09	553.82	407.78	146.08	1555.14
ED	0.213	0.203	0.113	0.028	0.420

Table (4.3) : Dose calculation of females .

	Mean	Median	STD	Min	Max
Age	41.25	41	12.51	22	60
KV	120	120	0.00	120	120
MAs	570.83	600	101.04	250	600
CTDIvol	23.58	17.46	20.43	8.06	80.67
DLP	508.07	405.92	268.61	253.22	1157.7
ED	0.257	0.301	0.14	0.042	0.434

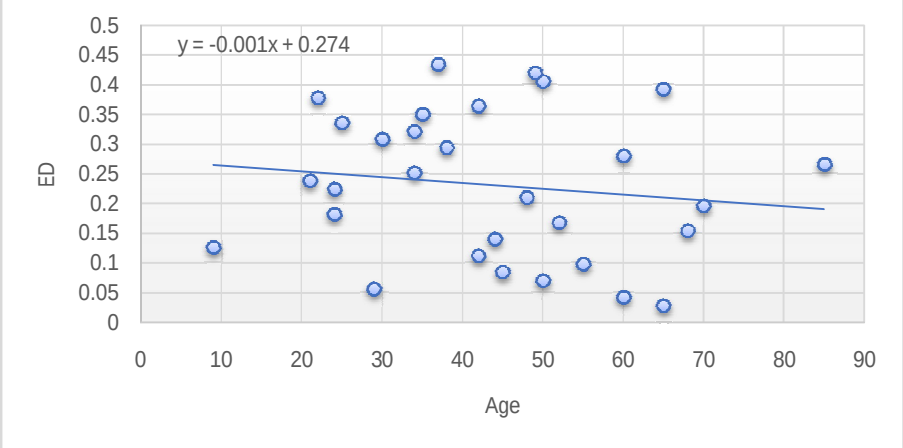

Fig (4.1) : The relationship between Age and Entrance dose .

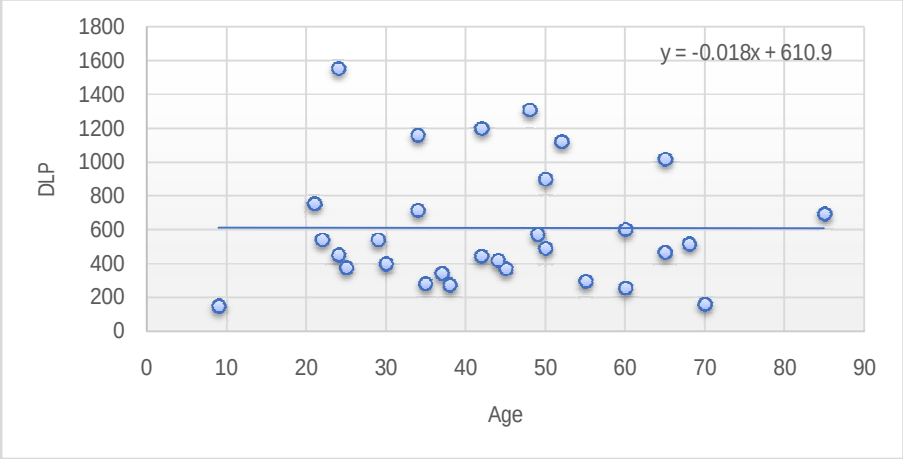

Fig (4.2) : The relationship between Age and Dose Length Product .

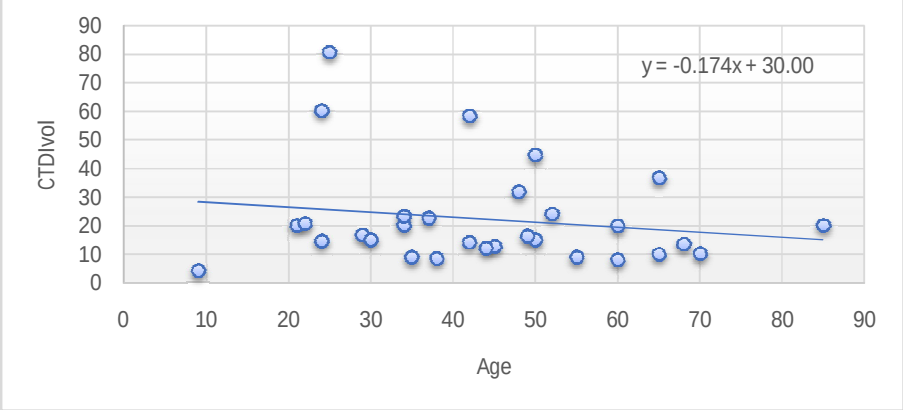

Fig (4.3) : The relationship between Age and CTDIvol .

CHAPTER FIVE

Discussion , Conclusion , and Recommendations

5.1 Discussion :

The recent CT modalities can potentially result in higher radiation exposure and hence a higher radiogenic risk to the patient due t increased capabilities of X ray tube which enable long scan lengths at high tube currents , as scanner technology has developed and its use has become more widespread, concerns over patient radiation doses from CT have grown, the introduction of multi-slice scanners has focused further attention on this issue, and it is generally believed that it will lead to higher patient doses. Therefore, significant variation of patient doses is expected. Patient mean ages were comparable, while the variation between minimum and maximum is great.

Image acquisition parameters are constant in CT imaging, there are a number of scan parameters and patient attributes that influence the dose and image quality in a CT exam. Some are user controlled (e.g. kV, mAs). Other factors are inherent to the scanner (e.g., detector efficiency, geometry). Still others are patient dependent (e.g., patient size, anatomy scanned). All these parameters are interrelated. A solid understanding of how each parameter relates to the others and affects both dose and image quality is essential to maintaining the dose as low as reasonably achievable (ALARA). Therefore, a careful evaluate the factors affecting patient dose is necessary.

Computed tomography, however, remains the technique of choice for evaluating head injury; assessing spinal , pelvic ,or abdominal trauma ; characterising parenchymal lung diseases; staging almost all solid tumours , including lymphoma; and treatment planning for most solid

tumours . However , the use of pelvic computed tomography for clinical staging in patients with high levels of prostate specific antigen cannot be recommended because of limited utility and lack of costeffectiveness.

Table (4.1) showed The average radiation dose to chest from CT scan obtained with fixed tube current was minimum ;0.028 mGy and maximum dose 0.438 mGy.

Table (4.2) present the dose calculations for females , and It showed the values ; CTDIvol (min : 8.06 mGy , max :80.67 mGy) , DLP(min :253.22 mGy.cm , max :1157.7 mGy.cm) , ED(min : 0.042 mGy , max :0.434 mGy) , and they were relatively higher than males CTDIvol(min : 4.2 mGy , max :60.32 mGy) , DLP(min : 146.08 mGy.cm , max : 1555.14 mGy.cm) , ED(min : 0.028 mGy , max : 0.420 mGy) .To sum up Females have higher radiation sensitivity compared to adult male , also the scan length in femals tend to be longer.

Fig (4.1) shows that ,there is no relation between the entrance dose decreases , and the age increase . Fig (4.2) showed the dose does not affect with the dose length product (DLP). Fig (4.3) showed the ED decreases , as the age increase .

5.2 Conclusion :

Dose estimation in radiography can be performed using a number of metrics, and comparisons or “rule of thumb” dose estimates may use ED as a surrogate indicator of approximate dose levels. A computation of radiation dose to an individual organ in the patient from radiography requires the use of published tables to convert entrance kerma levels to organ doses, along with the known exposure conditions and techniques. There are a number of accurate methods for computing the dose in CT,

for the purposes of technique optimization and for monitoring patient dose levels. In most cases, the estimation of radiation absorbed dose (in mGy) to a model patient with dimensions approximate to an actual patient is sufficiently accurate. Dose estimates for a specific patient can be made by including corrections for patient diameter and corrections for the actual scan length used . Organ dose generally decreases with the use of tube current–modulated acquisition, but patient size can directly affect the dose reduction achieved.. Readers should refer to root documents and other literature for more specific details on dose estimation in CT.

5.3 Recommendations :

- Best strategies available must be used, for dose reduction to optimize the patient dose, hence reduce patient cancer risks.
- Clear justification of examination is highly recommended, avoid repetition of examination (CT examinations should not be repeated without clinical justification) .
- Further studies with large samples should be done. Modern computed tomography machine with new accessories should be available in all over government hospitals and with qualified trained radiology technologist.

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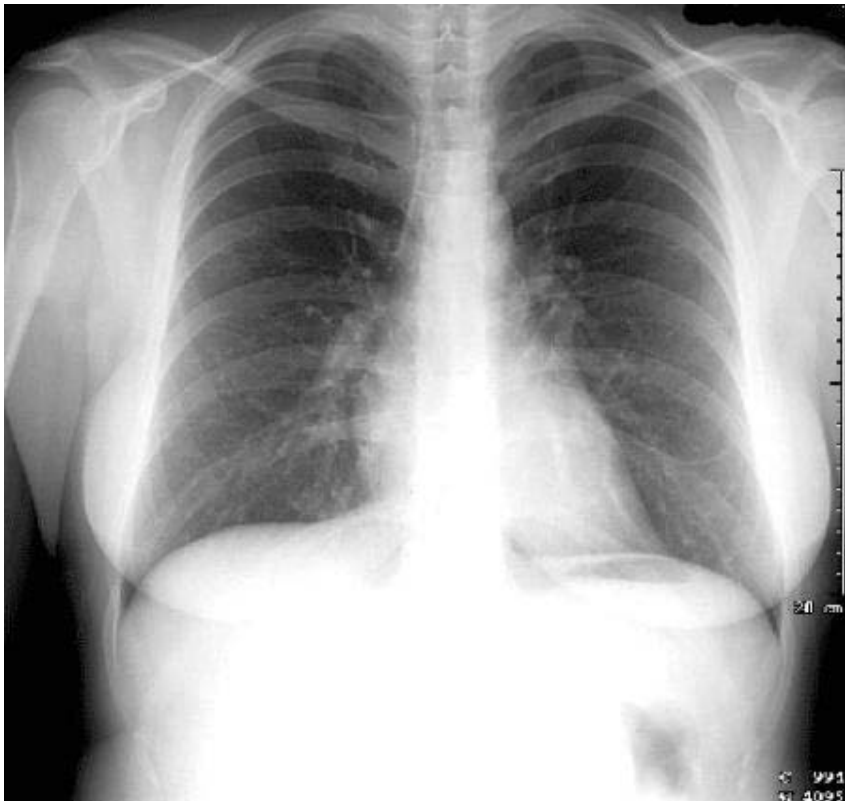
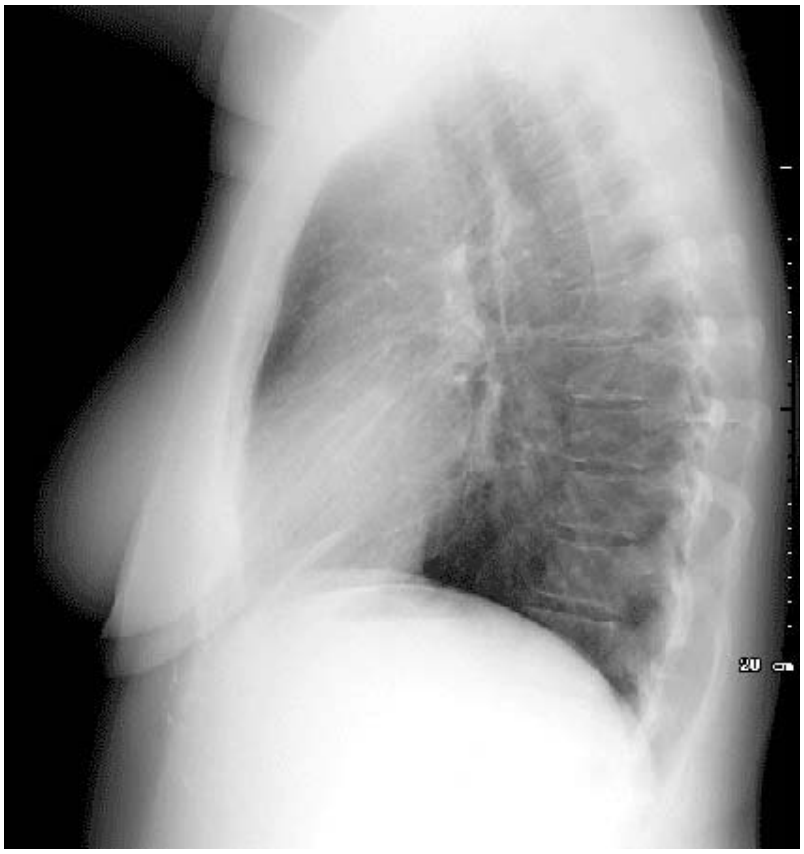
APPENDEX :

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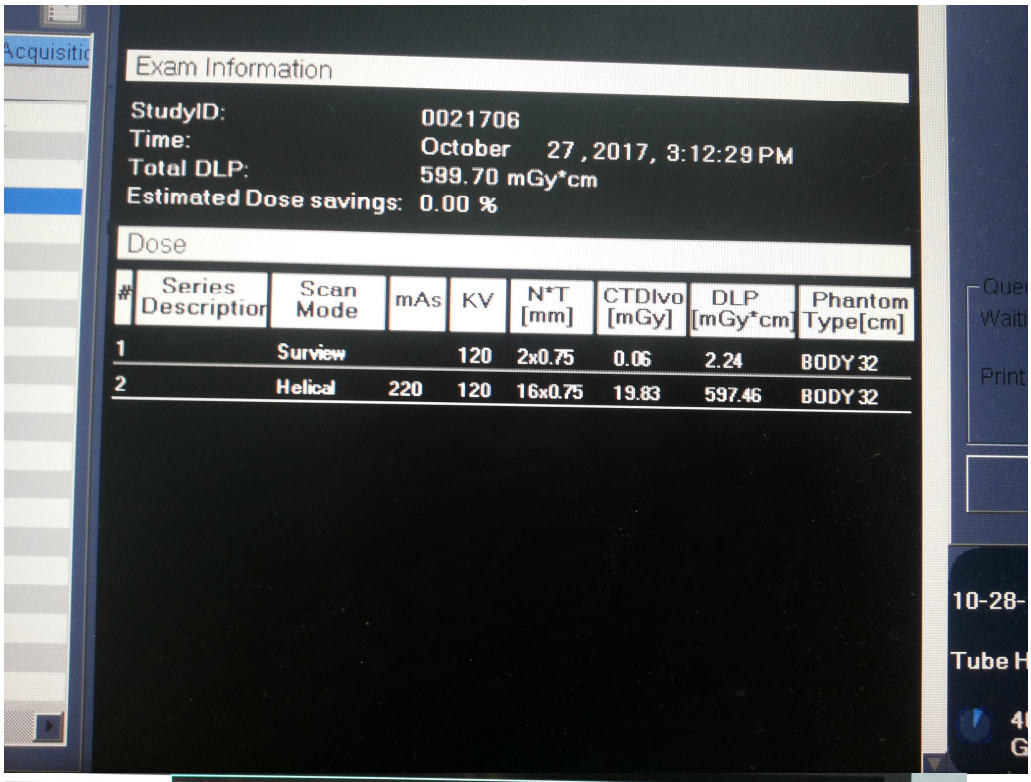
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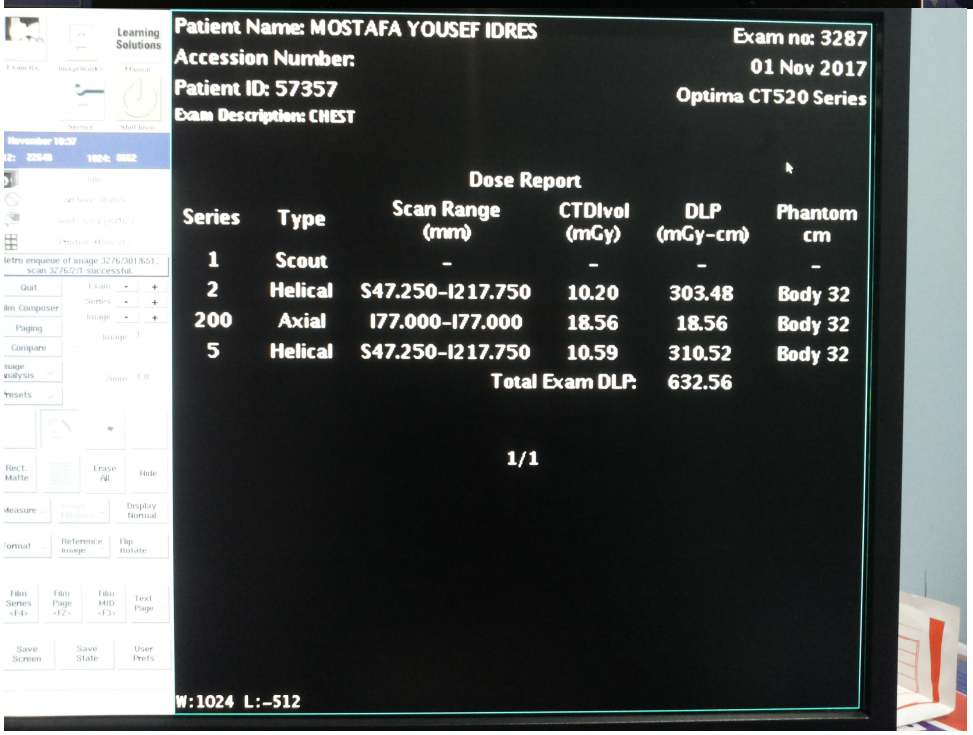
1 Surview 120 2x0.75 0.06 2.24 BODY 32
2 Helical 220 120 16x0.75 19.83 597.46 BODY 32


Patient Name: MOSTAFA YOUSEF IDRES
Exam no: 3287
Accession Number:
01 Nov 2017
Patient ID: 57357
Optima CT520 Series
Exam Description: CHEST
Dose Report
Series Type Scan Range (mm) CTDIvol (mGy) DLP (mGy-cm) Phantom cm
1 Scout - - - -
2 Helical S47.250-I217.750 10.20 303.48 Body 32
200 Axial I77.000-I77.000 18.56 18.56 Body 32
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1/1
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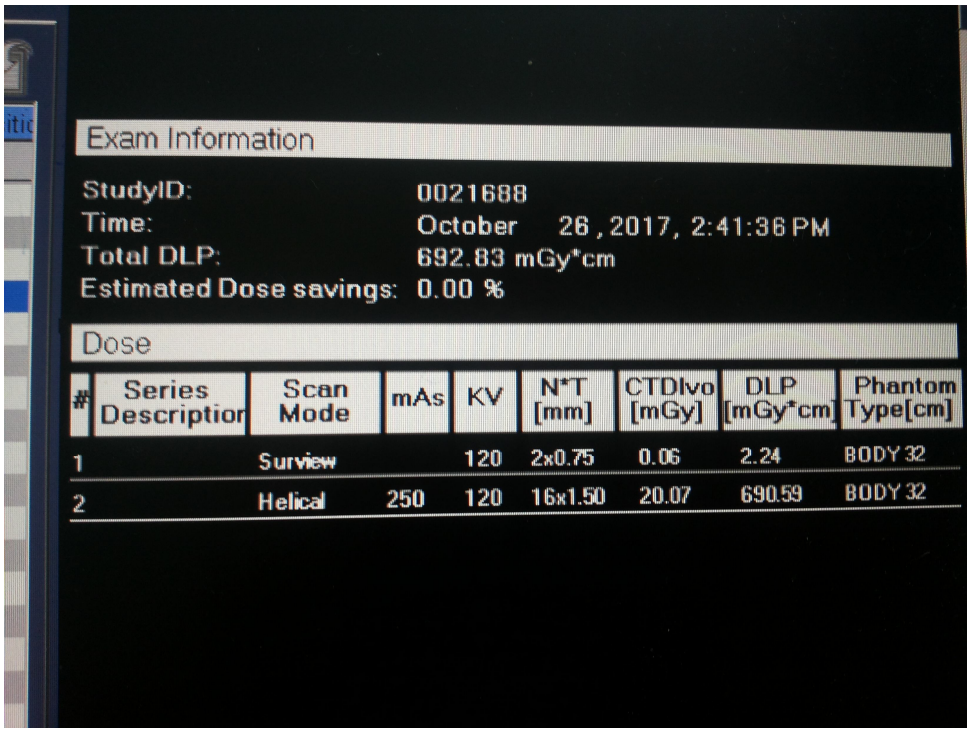

Exam Information

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Dose

#	Series Description	Scan Mode	mAs	KV	N*T [mm]	CTDIvo [mGy]	DLP [mGy*cm]	Phantom Type[cm]
1		Surview		120	2x0.75	0.06	2.24	BODY 32
2		Helical	250	120	16x1.50	20.07	690.59	BODY 32