Dedication

To my family….

Acknowledgement

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My prayers for all of them.

(Abstract (English

Over the past decade, faster CT scan, thinner collimation, and the development of multi detector computed tomography (MDCT), coupled with the increasing capability of computers to process large amounts of data in short periods of time, have lead to an expansion in the ability to create diagnostically useful two-dimensional (2D) and three-dimensional (3D) images within the thoracic inlet. Applications within the thorax include, but are not limited to, evaluation of systemic vasculature, and the trachea, and delineation of thoracic inlet disease. Multiplanar (MPR) images increased understanding of thoracic inlet anatomy. Because there are strengths and weaknesses to all the reconstruction algorithms, the utility of any given technique is dependent on the clinical question to be answered. For instance, although maximum intensity projection imaging (MIP) is helpful in the evaluation of blood vessels, it is of little value in the diagnosis of enlarged lymph nodes.

The importance of this study comes from the importance of thoracic inlet because it is a common area to obtain venous access for renal dialysis, or CT guided biopsy and has many structures with variations in appearance which

mimic pathological changes. It is important to have a clear understanding of the anatomy of the thoracic inlet structures and their relationship to each others to avoid accidently arterial puncture or nerve damage in CT guided biopsy or misinterpretation of normal structures e.g non opacity blood vessel as enlarged lymph nodes. Computed tomography is an excellent method to delineate the anatomy of thoracic inlet structures. Variations in the anatomy of the thoracic inlet structures and their correlation to the x-ray findings.

This study aims to objectively evaluate the variations in the anatomy of thoracic inlet structures, the structures sizes, appearance and their relations to each others. A total of 328 patients were evaluated using MDCT imaging. The measurements and identifications of thoracic inlet structures were done at five levels, 7^{th} cervical vertebra, 1^{st}, 2^{nd}, 3^{rd}, and 4^{th} thoracic vertebra. The average size of main thoracic inlet structures, trachea, esophagus, internal jugular vein IJV, common carotid artery CCA subclavian artery and neural canal was measured. The percentages of identifying small vessels, lymph nodes, thyroid gland, thyroid isthmus, thymus gland, neck muscles, thoracic duct, right lymphatic duct and nerve were recorded and analyzed. The study showed differences in sizes of some of thoracic inlet anatomical structures, between males and females group. In bilateral structures e.g the right internal

jugular vein (RIJV) was more often larger than the left internal jugular vein (IJV). With reference to the common carotid arteries (CCA), 78.5% of the IJV were found in the lateral position, 20.5% anteriorly 1.0 % posteriorly. There were significant differences in appearance of identified structures at different levels. The appearance of lymph nodes, was more in tumor patients (36%) followed infection patients (9%). Thymus remnant was more identified in yang patients, (76.6%) in age group 30to 40 years, (65. 5 %) in age group, 41 to 50 years, and only (10.5 %) in group above 50 years.

ملخص الدراسة

التطور الذي حدث في سرعة المسح بجهاز الاشعة المقطعية متعدد الكواشف , ودقة حصر الاشعاع مقرونة بزيادة كفاءة الحاسوب ومقدرته بمعالجة كميات كبيرة من المعلومات في فترة وجيزة , أدي الي التمكن من تكوين صورة ثنائية وثلاثية الابعاد ذات فائدة تشخيصية عظمي لمختلف أعضاء جسم الانسان خاصة منطقة مدخل الصدر .

من اهم اهداف هذه الدراسة معرفة الاختلافات التشريحية واحجام بعض الاجزاء التشريحية فى مدخل الصدر . كما تهدف الدراسة ايضاَ لمعرفة نسبة تمييز بعض الاجزاء التشريحية الصغيرة الحجم في صورة الاشعة المقطعية .

أستخدام أجهزة الاشعة المقطعية متعددة الكواشف مكن من تقييم الجهاز الدوري والقصبه الهوائية والمرئ والعضلات مع إظهار التغيرات المريضيه التي قد تحدث في منطقة مدخل الصدر , وذلك بفصل تقنية الصور متعددة المحاور والتي سهل فهمنا لتشريح مدخل الصدر, فما مكن المختصين من عمل القصطرة الوردية , وأخذ العينات من الخلايا المريض بمساعدة جهاز الاشعة المقطعية , مع وجود عدة اختلافات تشريحية قد تظهر مماثلة لتغيرات المريضية الان هنالك مميزات خاصة لكل من برمجيات تكوين الصور, استخدام اى من تلك البرمجيات يعتمدعلى التغيرات التى يراد توضحها, مثال ذلك تقنية اسقاط وحدة الصورة عالية الكثافة ممتازة جدا فى تقييم الاوعية الدموية و ليست ذات جدوى فى تقييم الغدد اللمفاوية.

أهمية هذه الدراسة تنبع من اهمية منطقة مدخل الصدر وذلك لان مدخل الصدر يستخدم عادة كمدخل وريدي ولاخذ العينات من الخلايا المريضية بمساعدة صورة الاشعة المقطعية، مع وجود عدة اختلافات تشريحية وخلايا

طبيعية تماثل التغيرات المريضية , ذلك لان الاشعة المقطعية تمكن من الرؤيــة والتمييز الجيد للاجزاء التشريحية في منطقة مدخل الصدر والعلاقات بين بعضها البعض مما يمكن من نتفادي ثقب شريان أو قطع عصـب أوالاشـتباه فـي بعـض الاجزاء التشريحية السليمة وتصنيفها خلايا مريضية مثال لذلك وعاء دمـوى غيـر معتم بصبغة التصوير قد يماثل غدة لمفاوية.

شملت هذه الدراسة 328 مريضا ممن ارسلوا لاقسام الاشعة المقطعية لعمل صورة مقطعية لمنطقة الصدر او العنـق حيـث يتـم عـادة تصـوير منطقـة مدخل الصدر مع هذين الفحصين.

مـن الصـور المقطعيـة تـم تحديـد الاختلاف التشـريحية واخـذ القيـاس للاجـزاء التشريحية كما تم ايضاَ تحديد نسـبة تمييـز بعـض الاجـزاء التشـريحية الصـغيرة الحجم في صورة الاشعة المقطعية في خمس مستويات هـي مسـتوي الفقـارة العنقية السابعة والفقارات الصدرية الاولى والثانية و الثالثة و الرابعة.

تم قياس متوسط حجم القصبه الهوائية المرئ , والوريد الودجي الداخلى والشريان السباتي العام والشريان تحت الترقوى, كما تـم تحديـد نسـبة تمييـز بعض الاجزاء التشريحية الصـغيرة الحجـم فـي صـورة الاشـعة المقطعيـة, مثـل الغـدد اللفاويـة , الغـدة الدرقيـة , الغـدة الصـنوبرية وعضـلات منطقـة مـدخل الصدروالالياف العصبيه المارة بمدخل الصدر.

أ ظهرت الدراسـة وجـود اختلافـات فـى احجـام بعـض الاجـزاء التشـريحية بيـن مجموعة الرجال و النساء. الاجزاء الزوجية مثل الوري الودجي الداخلى الايمـن اكبر حجما من الوريد الودجي الداخل الايسروذلك الحال مـع الشـريان السـباتى العام الايسر فبالاغلب اكبر حجما من الشريان السباتى الايمنو كما وجد الدراسة ان وضع الوريد الودجي الداخلي بالنسبة للشريان السباتى العام بالنسـبة 78.5 % يوجد فى الجانب و 20.5% فى الامام و 1.0% فقط يوجد خلف السباتى.

هنالك نسب مختلفة لروية و تمييز الاجزاء التشريحية في مستوى الفقرات, كما ان هنالك اختلاف فى نسبة وجود الغدد اللمفاوية في صورة الاشـعة المقطعيـة حسب الحالة المرضية

حيث تظهر أكثر في مريضى الاورم (36%) ومرضى الالتهابات (9%) .

الغده الصنوبرية تختلف نسبة ظهورها بختلاف الفئة العمرية حيث تصل الى (76.6%) في الغده لعمر من 30-40 سنه و(65.5%) في الفئة العمرية من 41-50 سنه و(10.5%) في الفئة العمرية اكثر من 51 سنه و فوق.

عند التخطيط للدراسات المستقبلية يجب أن تسطصحب الدراسة نوع هيكل جسم المريض والوزن الاختلاف العرقية .

List of Abbreviations

2D	Two Dimensional
3D	Three Dimensional
AP	Anterioposterior
ASDL	Arteria subclavia dextra lusoiria
BW	Beam width
CCA	Common Carotid artery
CT	Computed Tomography.
CTA	Computed Tomography Angiography
D	Number of detectors
D	Rotation of x-ray tube
DICOM	Digital Imaging And Communication in Medicine
FOV	Field of View
FW	Filter Width

GE	General electric
HQ	High quality
HS	High speed
HU	Hounsfield unit
IJV	Internal jugular vein
ITV	Internal thoracic vein
IV	Intravenous
KHU	Kilo heat unit
KV	Kilovoltage
KW	Kilo watt
LITV	Left internal thoracic vein
M	The number of simultaneously acquired interweaving helices
M.S	Beam width
mAs	Milliampare /second
MDCT	Multidetector computed tomography
mGy	MiliGray
MHU	Maga heat unit
MIP	Maximum intensity projection
MPR	Multiplanar reconstruction
MSCT	Multislice Computed Tomography
P	Pitch
PACS	Picture Achieving Communication System
RITV	Right internal thoracic vein
SW	Slice width
VR	Volume rendering
VRT	Volume rendering technique

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