

الآية

قال تعالى:

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صدق الله العظيم

(سورة الإخلاص من الآية 1-4)

Dedication

- ❖ **To the candles that burn to light my way, my lovely parents**
- ❖ **My father, who made all the cheap and precious for the sake of my arrival to this stage, my father thanks.**
- ❖ **My family's love, patience, and support were essential to the completion of this research.**

- ❖ **To my friends and my colleagues.**
- ❖ **To my medical physics family i.**
- ❖ **I dedicate this work to you**

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To all of them send my deep appreciation and recognition

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List of abbreviations

BPH: Benign prostatic hyperplasia.

PSA: Prostate-specific antigen.

3D CRT: three-dimensional **Conformal Radiotherapy**.

2D CRT: Two-dimensional Conventional.

TPS: Treatment planning system.

ICRU: International Commission on Radiation Units.

GTV: Gross Tumour Volume.

CTV: Clinical Target Volume.

PTV: Planning Target Volume.

OAR: Organ at Risk.

DVHs: Dose–volume histograms.

CT: computer tomography.

MRI: **Magnetic resonance imaging**.

SPECT: Single photon emission computed tomography.

PET: **Positron emission tomography**.

MLCs: Multiple leaves collimator.

MV: mega volte.

IMRT: Intensity Modulated Radiotherapy.

EPID: Electronic portal imaging device.

V107%: Volume of PTV receiving 107% of the prescribed dose.

V95%: Volume of PTV receiving 95% of the prescribed dose.

Rect: Rectum.

Blad: Bladder.

V₅₀%: Volume receiving 50% of the prescribed dose.

V₇₀%: Volume receiving 70% of the prescribed dose.

V₄₀%: Volume receiving 40% of the prescribed dose.

V₆₅%: Volume receiving 65% of the prescribed dose.

V₇₅%: Volume receiving 75% of the prescribed dose.

D₉₅%: Dose receiving 95% of the volume.

Abstract

In this study comparison between 2-dimensional and 3-dimensional techniques for external-beam radiation treatment for prostate cancer is done. Dose homogeneity within the target volume and doses to critical organs, uninvolved anatomic structures were evaluated. Computed tomography (CT) scans of 30 patients with localized prostate cancer (T2N0M0) were acquired and transferred to the treatment planning systems. The target volume and uninvolved structures were contoured on axial CT slices throughout the volume of interest. A comparison of the 2 treatment techniques was performed using isodose distributions, and dose-volume histograms. Dose distribution the same in 2D & 3D technique; however, the 2D technique delivers unnecessary radiation doses to the rectum and bladder.

It was found that In this study found average (V_{70} , V_{75} and D_{95}) for the rectum 2D it found 35.5%, 32.2% , 34% respectively and for 3D it found 8.4%, 0.2%, 12% respectively also found average (V_{40} , V_{65})for the bladder 2D it found 80.8% , 74.9% respectively and for 3D it found 20.4%, 17% respectively

Also to RT and LT hip in 2D average V_{50} found 17 % , 20 % respectively and for 3D was 4 % , 3% respectively.

These results show that 3D in the limit, but the 2D higher than the allowable limit, causing a danger to members of sensitive.

Also In this study was found for PTV average ($V_{95\%}$, $V_{107\%}$) for PTV 2D = 90.6%, 5.7% respectively, and for 3D was found 94.9%, 3.8 respectively.

This indicates that there is no significant difference in dose coverage and distribution and homogeneity.

ملخص البحث:

في هذه الدراسة مقارنة بين ثنائي وثلاثي الابعاد لعلاج سرطان البروستات بالإشعاعي الخارجي، وتقييم التجانس لجرعة الهدف والجرعة للأعضاء الحساسة و تقييم الهياكل التشريحية غير المتورطة.

أجري مسح ل 30 مريض بسرطان البروستاتا عن طريق التصوير المقطعي من النوع (T2N0M0) وتحويلها إلى وحدة تخطيط العلاج. الورم والاعضاء الحساسة تم تحديدها بواسطة شرائح التصوير المقطعي . تم إجراء مقارنة بين التقنيتين بالنسبة لتوزيع الجرعات ، ورسوم بيانية بين الجرعة الواصلة والحجم وجد أن توزيع الجرعات هي نفسها في التقنيتين ، إلا أن تقنية استخدام ثنائي الابعاد يوصل جرعات إشعاعية لا لزوم لها على المستقيم والمثانة

حيث وجد أن متوسط (V_{70} و V_{75} و D_{95}) للمستقيم في ثنائي الابعاد = 35.5%، 32.2%، 34% على التوالي وبالنسبة لثلاثي الابعاد = 8.4%، 0.2%، 12% على التوالي ، أيضا وجد أن متوسط (V_{40} ، V_{65}) للمثانة في تقنية ثنائي الابعاد 80.8%، 74.9% على التوالي وبالنسبة لثلاثي الابعاد وجد 20.4%، 17% على التوالي، أيضا للفخذين الأيمن والأيسر لثنائي الابعاد وجد أن متوسط V_{50} = 17%، 74.9% على التوالي أما بالنسبة لثلاثي الابعاد وجد انه = 4%، 3% على التوالي.

هذه النتائج تظهر أنثلاثي الابعاد في الحد، ولكن ثنائي الابعاد تجاوز الحد المسموح به مما يؤدي إلى زيادة الخطر للأعضاء الحساسة.

أيضا في هذه الدراسة وجد أن متوسط ($V_{95\%}$ ، و) ($V_{95\%}$ ، 5.7%، 90.6% = $V_{107\%}$ على التوالي وايضا لثلاثي الابعاد 94.9%، 3.8%، هذا يشير إلى أنه لا يوجد اختلاف كبير بالنسبة لتوزيع الجرعة على الورم والتجانس.