

بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها على هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار الخدارة من ١٥-٥٠ مئوية ورطوية نسبية من ٢٠-٠٠%. To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%



بعض الوثائـــق الاصلبــة تالفــة



بالرسالة صفحات لم ترد بالاصل

Internal mammary radiotherapy in operable breast cancer

Thesis

Submitted in partial fulfillment for the Master degree (M.Sc.) in radiation oncology

Ву

Rania Mahmoud Abdel Aziz M.B.B.Ch.

Supervisors

Pro¶Omar El Farouk Zaki

Prof. of clinical oncology

Head of clinical oncology department

Cairo university

Prof. Mohsen Samy Barsoum Prof. of radiation oncology National Cancer Institute

Cairo university

Dr. Azza Mohamed Nasr Lecturer of radiation oncology National cancer institute Cairo university

> Cairo university 2002

بحضير

اجتماع لجنة الحكم على الرسالة اليقدسة مسسن العلميه / سرالسنده في ويوسطاله ريو هي في العلم الما توريد الما تتسواة من الما المرسنة المرسنة المرسنة الما المرسنة الما المرسنة الما المرسنة الما المرسنة الما المرسنة المرسن

Toternal mannar tadiotherapy : in especiable breast Cancin
-12 especable breast Carcin
: باللغة العربية : تَـ شَرِي الله عَالِيةِ لَا تُحَدِيثُ اللهُ عَالِي الْمُعَالِيةِ لَا تُحَدِيثُ اللهُ عَالَ مَنْ طَلَاثُ لِي اللهُ عَالَمُ اللهُ عَالَمُ اللهِ عَلَى اللهِ عَلَى اللهِ عَلَى اللهِ عَلَى اللهِ عَلَى الله من طلات خطان المركم الله الله على المركمة الله على المركمة الله على المركمة الله على المركمة الله على ال
ا باللغة العربية المستمين المس
Cy 2 31 co 1 31
بناء طن موافقة الجامعة بتاريخ ١١ /٢٨ / ٢٠ عن تشكيل لجنة الفحس والبناتشة للرسالة
أامذكيمة أعبسلاه على النحسو التالي: سسم
() 4.1 \(\frac{1}{2}\) \(\frac{1}2\) \(\frac{1}{2}\) \(\frac{1}2\) \(\frac{1}2\) \(\frac{1}2\)
يمد نسس الرسالة بواسطة كل عنومنفردا وكتابة تفارير منفودة لكل خيهم لمنعيدة اللجنة مجتبعة محتبعة محتبعة محتبعة م يهم مسسسبتانين ١/١٥ كـ ٢٠ كـ ٢٠ بغسم عمر كوالي المراكبين المراكبين المراكبين المراكبين المراكبين المراكبين المراكبية الطالب في جلسة علنية في موسيع الرسالة والنتائج التي تحسسل المراكبين التي تحسسل المراكبين المراكبي
علم الله على الله على الله الله الله الله الله الله الله ال
إليها وكذلك الاسس العلدية التي قام عليها البحث .
- LE JAMES AL COLLEGE : & LINE IN THE STATE OF THE STATE
إليها وكذ لك الأسرالعلمية الني فام عليها البحث ، في المرا للبحث ، في المرا للبحث ، في المرا للبحث ، في المرا للبحث ، في المرا اللبحث ، في
ترفيمات أعضاه اللبنسة :
البغرف البيتعسن ﴿ البيتعن الداخِلسِ البعثين العلاجِسِي
- Line of the second
(مسام)

ABSTRACT

This study aims at determination of the position of IM lymph node using lymphoscintigraphy to establish the best technique for IM radiotherapy with the least cardiac dose. 24 patients to whom two different plans were done Plan I: IM field + two tangential fields .Plan II: 2 tanges According to the results of lymphoscintigraphy, the traditional IM field was changed in 14 of 24 patients (58.3%), The mean dose to IM nodes in plan I was $4510cGy \pm 171$ while it was $3989cGy \pm 715$ in plan II. The mean percentage cardiac dose in plan I was $54.5\% \pm 12.57\%$ while in plan II it was $9.16\% \pm 4.66\%$, (P:< 0.001). The mean dose to the heart decreases by increasing the volume, This is also significant regarding the lung as the mean percentage lung dose in plan I was $46.53\% \pm 14.73\%$ while in plan II it was $24.5\% \pm 4.2\%$ with P < 0.001.

KEY WORDS:

Internal mammary, Lymphoscintigraphy, Cardiac, Lung, Complications

To my ...

family

ACKNOWLEDGEMENT

First of all , thanks –giving is due to GOD , through HIM every thing was made .

I would like to express my deepest gratitude and sincerest thanks to my supervisors :

Prof. Omar Zaki

Prof.. Mohsen Barsoum

Dr. Azza Nasr

for their moral support , judicious advice, guidance and meticulous revision of the work .

I owe a great debt to many, many members of our nuclear medicine department, I would like to express my thanks to Dr. Magdy Kotb for his precious advice.

I am also indebted to our physicist: Aida Radwan, she offered a great effort in doing the dose - volume histogram.

Finally, acknowledgment is not merely a "pro-forma" thanks as sincerely offered and well deserved.

Contents

Title	Page
Introduction and aim of work	1
Review of literature	2
Anatomy of the breast	2
Indications and techniques of post mastectomy radiation therapy	7
Indications of radiotherapy	7
Post mastectomy radiation therapy techniques	8
Internal mammary lymphoscitigraphy	11
Controversies in internal mammary radiation	14
Post radiation cardiac complications	21
Radiobiological and pathological perspectives	21
Factors influencing cardiac toxicity	28
Investigations for evaluation of radiation induced cardiac damage	37
Pulmonary complications	42
Pathology of radiation induced lung damage	42
Fractionation and volume effect on lung damage	44
Lung toxicity of chemotherapeutic agents	46
Risk of pulmonary complication with different technique	48
Other long term toxicities	56
lymphedema	56
Brachial plexopathy	58
Rib fractuctures	59
Patients and methods	62
Results	82
Discussion	95
Summary	103
Conclusion	106
References	107
Arabic summary	

List Of Tables

Title	Page
1. Radiotherapy details	60
2. Distribution of patients according to laterality	82
3. Distribution of patients according to the site.	84
4. Distribution of patients according to the size	85
5. Distribution of patients according to grade	86
6.Distribution of lymph nodes lymph nodes according to site detected by lymphoscitgraphy	87
7. Differences between doses reaching the lung in right and left breast sided patients	88
8.Differences between doses reaching different volumes of the heart in right and left breast sided patients	88
9. Differences in mean doses to heart by two plans	92
10. Differences in doses to different volumes of the heart .	93
11 Differences in mean doses to the lung by two plans	93

:

List Of Figures

TITLE	PAGE
1. The principal lymphatic drainage of the breast to the axilla.	3
2. Surgical dissection for lymph node sampling. Lymph node involvement by tumor tends to be progressive from level I to level III.	3
3a.Transversal section through the mamillary plane. Example of the original dose plan for wide field(a) and limited field (b) treatment technique in postoperatively irradiated patients	49
3b. Transversal section through the mamillary plane. Reconstruction of dose distribution with correction for lung tissue for wide field(a) and limited field (b) treatment technique in postoperatively irradiated patients	49
4. Transversal slice through the middle of the breast for Technique A(a) and Technique B (b) showing the external contour, heart and lungs. Field outlines and 95 and 50% isodose lines are shown. Note the low-dose region present in technique A between the IM-MS fields and the tangential fields	53
5. NTCP values for excess late cardiac mortality. The NTCP values for the tangential field technique (gray bars) were significantly lower than the NTCP values for Technique A (black bars) and Technique B (open bars).	53
6. NTCP values for radiation pneumonitis grade 2 or higher. The NTCP values for Technique A (black bars), Technique B (open bars) and the tangential field technique (gray bars) were generally below 0.5%.	54
7. Internal mammary (IM) lymphoscintigraphy for post mastectomy treated	66

patient showing IM lymph nodes within the traditional IM field (5x12cm)	
8. Internal mammary (IM) lymphoscintigraphy for post mastectomy treated	67
patient showing IM lymph nodes crossing midline to contralateral side (out side	
the traditional IM field (5x12cm))	
9. Postmastectomy treatment volume	71
10.Dose volume histogram for post mastectomy irradiated patient by	77
irradiated patient by tangential fields for IM, target, heart, lung.	
11.Isodose distribution for postoperatively irradiated patient by tangential fields.	78
12.Isodose distribution for postoperatively planning using tangential fields +	79
IM field for IM, target, heart, lung.	
13.Dose volume histogram for postmastectomy irradiated patient by planning	80 -
using tangential fields for target, heart, lung.	
14.Distribuation of cases according to laterality	83
15.Distribuation of patients according to site of the tumor	84
16.Distribuation of cases according to tumor size	85
17. Distribution of cases according to grade of tumor	86
18. Distribution of lymph nodes according to site by lymphoscintgraphy	89
19. Differences between the 2 plans as regard the dose reaching the heart and lung	90
20.Differences between right and left breast as regards mean dose reaching to different % of the heart volume	91
21: Differences between 2 plans as regards the mean percentage dose reaching the heart and the lung	94
22. Doses to different volumes of the heart by using 2 plans	94