Two months experience on Radiation Oncology in Siriraj Hospital Bangkok, Thailand

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Abstract :

The most frequent cancer of this Institution was the carcinoma of uterine cervix presented at stage II and stage III in more than 80% of cases. Peak age was between 40 years and 59 years (more than 60%) and less common before 30. Radiotherapy was the first line of treatment in more than 90% of cases as suggested by gynecolog ical tumor clinic. The result of radiotherapy in cancer cervix was encouraging as shown in the follow up clinics.

In surgical tumor clinic, about 60% cases belonged to head neck region. Out of them nasopharyngeal cancer compriserd of 20%. Head neck cancer predom inated male. Breast cancer comprising of 12.72% was in the second position and predominated in female. Lung cancer comprised of 7.27%. About 80% of the cases were presented at stage III and stage IV. Radiotherapy was suggested in about almost all cases but in about 50% of them rediotherapy was adjuvanted with chemotherapy.

Introduction :

Radiation oncology division of Siriraj Hospital, Thailand has one linac, two Cobalt-60 Machines and one X-ray (55 Kv) machines for external therapy and caesium 137 (LDR). Radium (LDR), Co 60 (HDR) for brachytherapy associated with Hyperthermia machine, Simulator and computor planing.

Patients are registered in this division according to the suggestion of tumor clinics. There are two types of tumor clinic. One surgical tumor clinic which includes all malignancies except gynecological cancer and organized by Radiation Oncologist, Surgical Oncologist, Medical Oncologist and Pathologist. This clinic held twice weekly on Monday and Thursday. The another one is the gynecological tumor clinic. Clinical staging and plane of treatment are done jointly by Gynecological Oncologist and Radiation Oncologist. Gynecological cancers are presented in this clinic which helds once weekly on Friday.

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There is another clinic named "follow up clinic" in which the gynecological cancer cases who had completed Radiotherapy or Radiotherapy and other combination therapy are examined clinically and in suspected residual or recurence cases pap's smear or biopsy is taken.

First three months of completion of treatment is the monthly follow up. If no residual or recurence, then one follow up in two months upto one year, then follow up once in three months depending on clinical findings.

The patients who are on radiation therapy and who had completed Radiotherapy come to consult with Radiation oncologist in out patient department.

Concurrent use of Chemotherapy and radiotherapy is also practised in advanced cancers and there is also arrangement of chemotherapy for outdoor and indoor patients.

This division arranges morning clinical meeting thrice weekly with the participation of all staffs.

In two months from 1.6.95 to 31.7.95 I have participated 16 surgical tumor clinics, eight gynecological tumor clinics, eight follow up clinics, everyday treatment planning for external therapy in gynecological cancers, head neck cancer, breast cancers, brain tumor, lung cancer and brachytherapy in gynecological cancers with simulation, computor planning and dose calculation. I have also observed the treatment of cancer by hyperthermia and attended each radiation oncologist's clinic once weekly to know individual view and research protocoal.

Beside these, I had different programmes, one day visit in gynecology oncology division, two days in medical oncology division of same institution and two days visit to Vajira Hospital to see the Iridium 192 HDR machine and it's application in different malignant cases.

I have participated in three seminars, - 1. New trend of hormone therapy in prostatic cancer and breast cancer 2. Mushroom and it's medical use 3. Boron Neutron Capture Therapy in brain tumor.

Materials and methods :

From 1st June 95 to 31st July 95 I had been placed in the division of Radiation oncology of Siriraj Hospital, Bangkok Thailand. The patients who had been presented in surgical tumor clinics, gynecological tumor clinics, follow up clinics and the patients who had been treated by brachytherapy within this period were collected. Their age, sex, diagnosis, histopathology staging and the suggestion of the tumor clinics were noted. From the follow up clinics the patients age, stage of disease, treatment given, period of treatment and findings of clinical examination were documented. The cancer patients treated by hyperthermia were also noted. I had every day works in physics room for computer planing and dose calculation of brachytherapy cases and also some external therapy of head neck cancer, gynecological, breast cancer, brain tumor.

From one day visit of Gynecological Division I had seen patients in the ward and also the cancer cases in out patients department and I collected their diagnosis, treatment schedule and research protocol.

Two days visit in Vajira Hospital I was acquainted with cobalt 60 teletherapy and Iridium 192 (HDR) and its application in difference cancer cases which were also noted.

After completion of two months, all the datas are compilled.

Result

All collected patients regarding their age, sex histopothology treatment, clinical findings, are shown in table below. table below.

Table 1. *From Gynecological tumor clinic, total no. of pts 109 in two months. Distribution of patients according to age/stage/histophatology*

Age groups	ca.cx No. of pt. (%)	ca.body of ut. No. of pt. (%)	ca.vagina No. of pt. (%)	ca.vulva No. of pt. (%)
30-39	22(21.57%)			
40-49	35(34.31%)			
50-59	27(26.47%)	2(50%)		
60-69	12(11.76%)	2(50%)0	1(100%)	1(50%)
70-79	6(5.88%)			1(50%)
	102	4	1	2
Histopathology				
Sq. cell ca.	79(77.45%)		1(100%)	2(100%)
Adenocarcinoma	18(17.65%)	4(100%)		
Adeno. Sq.	5(4.90%)			
Stage I	10(9.80%) (S)			
II	50(49.02%) (R)	2(50%) (R)		
III	41(40.20%) (R)	2(50%) (R)	1(R)	2(R)
IV	1(00.98%) (R)			

R = Radiation S = Surgery (Suggesion of Gyne tumor clinic)

Table 2. *Gynecological cancer patients are treated by external therapy and Intacavitary Brachytherapy. Dose of external therapy 40 Gy in 4 wks to 50 Gy in 5 weeks. Usually after complete of 4000 cGy one ICRT in sertion by caeseum 137 (LDR) is followed. The gynecological cancer cases having ICRT in two months.*
total. No. of patients 68
Distribution of patients according to age and stage.

Age	Ca.cx. No. of pt. (%)	CA.corpus No. of pt. (%)
30-39	12(18.46%)	
40-49	22(33.85%)	2(66.67%)
50-59	18(27.69%)	
60-69	6(09.23%)	
70-79	5(07.69%)	1(33.33%)
80-89	2(03.08%)	
	65	3

Stage	Ca.cx.	Ca.corpus
I	7(10.77%)	2(66.67%)
II	33(50.77%)	1(33.33%)
III	25(38.46%)	
IV	0	
	65	3

Table 3. *In follow up clinic, the gynecological cancer patients who had completed Radiotherapy or Radiotherapy and other adjuvant therapy were examined clinically. Total number of patients attended in this clinic in two months (June and July) was 352. Distribution of patients according to site of lesion, age, stage and duration of treatment and clinical findings.*

Age (yrs.)	Ca.cx. No.pts. (%)	Ca.corpus No.pts. (%)	Ca.vagina No.pts. (%)	Ca.ovary No.pts. (%)
20-29	6(1.80%)			1
30-39	62(18.67%)			
40-49	114(34.34%)	4(23.53%)		
50-59	94(28.31%)	7(41.18%)	1	1
60-69	48(14.46%)	5(29.41%)		
70-79	8(02.41%)	1(5.88%)		
	332	17	1	2

stage	Ca.cx.	Ca.corpus	Ca.vagina	Ca.ovary
I	43(12.95%)	2(11.76%)		1
II	183(55.12%)	7(41.18%)	1	1
III	105(31.62%)	8(47.06%)		
IV	1(0.30%)			
	332	17	1	2

one case of ovarian malignancy of 20 years, granulosa cell tumor treated by surgery and radiotherapy 7 years back and the other case of 56 years, serous cyst adenocarcinoma treated by surgery and radiotherapy one year back. Now on follow up examination these patients have no evidence of recurrence.

Table 4. *Follow up clinic Patients are distrituted according to the duration of completion of treatment.*

Duration	No. of patients
within this year	69
1 "	65
2 "	40
3 "	33
4 "	27
5 "	20
6 "	13
7 "	14
8 "	18
9 "	10
10 "	10
1 "	5
"	7
13 "	3
14 "	2
15 "	4
16 "	3
17 "	3
18 "	3
19 "	1
20 "	0
21 "	1
22 "	1

Table 5. *Follow up clinic Findings of clinical examination. No. of ca. cervix 332, corpus 17. ca.vagina 1, ca.ovary 2.*

	ca.cx	ca.corpus	ca.vagina	ca.ovary
*Skin fibrosis	15(4.51%)	2(11.76%)		
*Vagina mucosal Agglutination	20(6.02%)	1(5.88%)		
*Necrosis in vagina/Fx/cx	8(2.41%)			
*Definite growth (local)	6(1.80%)			
*Rectal mucosal reaction	10(3.01%)	2(11.76%)		

Remianing cases were found well controlled.

* vaginal mucosal agglutination and necresis were seen ususally in the patients who have completed treatment within 6 months.
* Skin fibrosis were seen in old cases who had been treated by high dose/fraction (350 cGy/frac./and 3 frac/week) and radium insertion.

Table 6. *Surgical ENT Tumor clinic. Total No. of patient 110, Male 59, Femal 51. in two months.*

	Male	Female	Total
Head neck cancer	43 (72.88%)	25 (49.01%)	68 (61.82%)
Lip	0	5	5
Gum	1	3	4
Buccal mucosa	3	3	6
Floor of mouth	2	1	3
Hard palate	1	1	2
Tongue	5	3	8
Tonsil	5	2	7
Soft palate	2	0	2
Hypopharynx	4	0	4
Larynx	6	0	6
Nasopharynx	10	4	14
Salivary gland	3	2	5
Middle ear	0	1	1
Thyroid	1	0	1
Conjunctiva	1	0	1
Breast cancer	0	14 (27.45%)	14 (12.72%)
Lung cancer	6 (10.17%)	2 (3.92%)	8 (7.27%)
G.I.T. Cancer	3 (5.08%)	5 (9.80%)	8 (7.27%)
Rectum	1	3	4
Colon	1	0	1
stomach	0	1	1
Liver	1	1	2
Miscelleneous	7 (11.86%)	5 (9.80%)	12 (10.9%)
Ca osophggus	1	1	2
Ca penis	2	0	2
Soft tissue	1	1	2
Ca gall bladder	0	1	1
Thymus tumor	1	0	1
Ca U.Bladder	1	1	2
Mets. tumor	1	1	2

TaBle 7. *Surgical ENT tumor clinic (in 2 months) Stages of the diseases*

Stage	I	II	III	IV
Head Neck ca.	1 (1.47%)	5 (7.35%)	55 (80.88%)	6 (8.82%)
Breast ca.		2 (14.29%)	9 (64.28%)	3 (21.43%)
G.I.T. ca.		1 (12.5%)	5 (62.50%)	2 (25%)
Lung ca.			6 (75%)	2 (25%)
Misc.		1 (8.30%)	8 (66.67%)	3 (25%)

Table 8. *The patients who had been treated by Hyperthernmia in two months. (June$July) are shown. No. of patients 14*

Diagnosis	No.pt./sex/age (yr)	Schedule	Therapy
*Ca. scalp	1/F/86	once in a wk.	Electron therapy
*Ca. Fl. of mouth e mets. node	1/M//%	"	Photon therapy
*Ca. pyriform fossa e hard fixed node	1/M/70	"	"
*Parotid gland tumor recurrence after surgery 10cm size	1/M/17	"	"
*Benign prostatic Hypertrophy	1/M/70	one time	no radiotherapy
*Ca.rt.up.eyelid e mets. to neck node	1/F/43	one in a wk.	Photon therapy
*Ca. base of tongue e neck node	1/F/53	"	"
*Breast cancer e chest wall recurr.	4/F/50 40 34 44	"	"
*Ca. Larynx e mets. neck node	1/M/55	"	"
*Ca. nasopharynx e mets. to neck node	1/F/25	"	"
*Ca. nasopharynx e mets. neck node	1/F/44	once in 3 wks.	Chemotherapy

Discussion :

Cervical carcinoma represents the leading female cancer in underdeveloped and low socio-economic level population in the word[1]. In Thailand the most common female cancer was carcinoma of uterine cervix[2]. The disease is usually silent in early stage and many of the patients have stage II or stage III disease before P/V bleeding or foul smelling discharge bring them to a doctor[3]. Analysing the cases of cancer cercix in gynecological tumor clinic gynecological brachytherapy treatment, follow up clinics it had been found that stage II was 49.02%-55.12% and stage III 31.62%-40.20% (table 1,2,3). The 5 years survival rate in stage I,II,III and IV were 75-90%, 50-80%, 30-50% and 0% respectively[2]. Concurrent use of chemotherapy (cisplatin 30 mg./m wkly.) and radiotherapy improved the survival rate[4]. So in this institution, there are several protocol for chemotherapy and radiotherapy simultaneously in advanced ca.cervix.

1. Paraplatin weekly and radiation
2. Mitomycin c and 5 F.U. and radiation.
3. Mitomycin c and UFT and radiation
4. Medroxy progesterone acitate and radiotherapy

In gynecolgical oncology of the same institute have another protocol in stage II and stage III, one cycle of chemotherapy with mitomycin c 50 mg./m intra arterial (through femoral artery to internal iliac artery), then follow up after one month and then surgery. In one day visit to the gynecology oncology

division, I found that the most cases were of ovarian malignancies, then ca.cx.sq.cell advanced recurence cases after irradiation, adenoca. of ca.cx endometrial cancer, choriocarcinoma.

Surgical ENT tumor clinic suggest chemotherapy and radiotherapy. In advanced head neck cancer two cycles of chemotherapy (cisplatin + 5.F.U.) and then chemo-radiation. In GIT cancer two cycel of chemotherapy (5FU/5FU + levamisole) and then chemo-radiation. In breast cancer in node positive case chemotherapy (post operative) with CMF or CMF 6 cycle and radiation. In advanced ca-beast. chemq-threapy 6 cycle-surgery, -if surgery not possible - hyperthermia + radiation. I had abserved the treatment of an inoperable brain tumor of glioma by chemotherapy paraplatin and radiotherapy in hyperfraction simulteneously. Within a short period the patients relieved of symptoms like hemiplegia.

Brachytherapy of this institution intracavitary radiotherapy (ICRT) in gynecological cancer is done by Cs.137(LDR) following the Manchesters technique and use Fletcher suit Applicators. Dose at point "A" is calculated on TDF factor-total TDF (Ext. + ICRT) not exceed 160. Rectol dose is calculated by direct measuring. Usually recta; dose above 100 R/h is not allowed. In use of vaginal cylinder on only two ovoids dose is calculated 0.5 cm below the vaginal mucosa.

Radium still now is used in this institution for implantation. I had seen one cases of ca. lower lip (1.5 cm × 2 cm) 55 years female treated by radium. Treated area was 10 cm (2.5 × 4). Total dosè was 6000 cGy. Plan implant single plane, cross end.

Source	No. of needle
2 mg. Ra.	3
1 mg. Ra.	2

Total mg. of Ra.

= (2 mg. × 3) + (1 mg. × 2)

= 8 mg.

Treatment time

$$= \frac{1500}{8}$$

= 187.5 h = 7 days 19 hour

(250 mg for 10 Gy in .5 cm distance)

In Vajira Hospital, Thailand for two days. I had seen the brachtherapy with iridium 192 (HDR) ICRT in five cases of ca. cervix 2 cases of ca. vagina; implantation in one case of ca. tonsil (recurrence and residual) one cases of vaginal recurrence in post operative ca.cervix, one case of soft palate cancer; intraluminal in two cases of ca. oesophagus, two nasopharyngeal cancer. Dose at point "A" in ca.cervixe was 6.5 Gy/fract and one week interval 4 fraction was given during the treatment of external therapy. In intraluminal cases dose in single booster dose 6.5 Gy/frac. after completion of external therapy and dose is calculated at 0.5 cm depth of mucosa.

I found a patient of 30 years of acute lymphoblastic leukemia after complete bone marrow and paripheral remission got total body irradiation before bone marrow transplatation. Tumor dose was 1200 cGy in 6 fraction -200 cGy/fraction/day. Whole body was divided into four regions with sheilding of the both lungs and kidneys and treated by cobalt 60, SSD - 160 cm., direct measuring the skin dose by placing seven points in each field.

I have observed the treatment of 14 cancer cases by hyperthermia. In Siriraj Hospital medium frequency microwave hyperthermia machine is used, depth is 3-5 cm./muscle, soft tissue. So it is used for superficial tumor. Usually two probes are used, one in the middle of cancer and other over the skin whose record temperature. This machin has cooling system by air cooler. Temperature was increased gradually 1c/1 minute up to 43c for 60 minute and then rest for 30 minute before radiation.

Indication of hyperthermia.

1. Radiotherapy failed (a) Residual (b) Recurrence cases.
2. Concurrent use of hyperthermia and radiation in radioresistant cases.
3. Concurrent use of hyperthermia with chemotherapy
4. To prevent micrometastasis after surgery to reduce the dose of radiotherapy

I had everyday programe in physics room. There I had observed routine check up of machines. In linear accelerator everyday

dosimetry of 10 × 10 field size in phantom with pressure and temperature and nonthly check up of dose prophyle of maximum field up 30 × 30 and also observed the measuring dose, percentage depth dose, Isodose chart by radiation field analyser. I have done computer planing of brachytherapy and some cases of external therapy and observed the making of plasic mould for fixation of patient.

On the seminar "mushroom" I had learned that one type of mushroom stratum lucidum contains protein and minerals and has hypoglycemic, anti hypertensive, anti cancer effects.

On the seminar Boron Neutron Capture therapy (BNCT) I have learned about history, biology, application, and plane of BNCT in Thailand. This is the most mordern treatment of brain tumor. Boron is introducted by intra-arterial or intravenously and then Neutron-therapy (epithermal). Boron has tendency to reside in tumor cell and capture neutron. Interection of neutron causes tumor cell dealth.

There was a programme on sterio-tactic method of radiosurgery. Three methods 1. Partical therapy 2. Co60 gamma knife 3. Linac steriotactic ring for fixation. Single dose 20-30 Gy is prescribed, tumor size must be less than 4 cm. usually by 5 arches indication 1. Benign brain tumor 2. Malignant brain tumor 3. Brain stem tumor, 4. Tumor of the base of skull 5. AVM 6. Metastatic brain tumor 7. Head neck cancer 8. Liver cancer.

Conclusion :

The pattern of maligancy in Thailand 6. not much differ from that of Bangladesh 7. the resulf of treatment of malignancy in this division is more or less satisfactory.

Adknowledgement :

I render my scincerest tribute of Prof. Pairat Tepmongkol for reviewing and enriching the artical by giving his valuable openion. I on gratefull to all the staff of this division for their cordial help.

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