**Ministry of healthcare of the Republic of Kazakhstan**

**The Kazakh Scientific Research Institute of Oncology and Radiology**

**RESIDENCY**

**Specialty**"Radiation therapy"

**SYLLABUS**

**Discipline «**Conformal radiation therapy»

Volume in hours - 225 hours / 5 credits

from them:

Lectures - 75 hours

Practical training - 75 hours

Independent work of resident - 75 hours

Form controls - examination

**Almaty,2017**

The syllabus is compiled according to the Model curriculum, the Residency Educational Program for the specialty "Radiation Therapy", the Instruction Letter No. 8 for the development of educational and methodological documentation in the organizations of the Republic of Kazakhstan, which are preparing for the residency approved by the Republican Center for Innovative Technologies of Medical Education and Science of the Ministry of Health of the Republic of Kazakhstan on April 27 2010 (Protocol No. 4).

Approved at the meetingRadiological Board

(Protocol 7 from "August" 25, 2017)

**Responsible for discipline: DMSTelguziyevaZh.A.**

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**3. Explanatory Note**

3.1 Introduction

3.2 The purpose of discipline

3.3 Tasks of discipline

3.4 Learning outcomes

**The purpose of discipline** is improvement in local-regional cure rates with the increase in overall and relapse-free survival and reducing the risk of post-radiation damage using the methods of conformal radiation therapy in patients with malignant tumors of various localizations.

**Tasks of the discipline:**

1) The Importance and role of conformal radiation therapy in radiation treatment of patients with malignant tumors.

2) Physical, chemical, and radiobiological basis of conformal radiation therapy and its technical support.

3) Basic techniques of conformal radiotherapy and its hardware.

**A resident must know:**

**-**The organization of radiological services, including highly specialized medical care in Kazakhstan.

- Regulations on activities of the radiology Department in the Republic of Kazakhstan and the job description, the algorithms and the user quality performance activities.

- History of the emergence and development of conformal radiation therapy.

- The physical and radiobiological basis of radiation therapy.

- Clinical-dosimetric bases of radiation therapy.

- Types of radiotherapy machines ofconformal radiation therapy.

- Variety of methods of remote radiation therapy depending on the localization process.

- Variety of methods of external beam radiotherapy depending on the method of application.

- The types of radioactive sources used in external beam radiotherapy.

- Safety, radiation safety standards and operation of devices with sources of ionizing radiation.

- Selection of methods of pre-treatment topographic training in conformal radiation therapy.

- Planning for conformal radiotherapy.

- Consideration of the radiation dose for conformal radiotherapy.

- The foundations of normal and topographic anatomy, radiology, ultrasound, CT and MRI for topographic planning of conformal radiotherapy.

- Prediction of the disease and prevention of reactions and complications during conformal radiotherapy.

- Indications and contraindications to the appointment of conformal radiation therapy in patients with various forms of malignant tumors with the selection of the optimal technique of irradiation.

- Rehabilitation of cancer patients that received radiation therapy and dispensary observation of cancer patients.

**The resident should be able to:**

- Analyze information about the disease, to identify common characteristics of the lesion, especially in cases requiring urgent care in the intensive care unit, to assess the severity of the patient and withdrawal of the patient from this state, to provide the necessary assistance.

- To interpret the data of special methods of research (laboratory, x-ray, ultrasonic, radioisotope).

- To determine the indications for hospitalization.

 - Pre-treatment topometry at conformal radiation therapy on x-ray or computerized simulators.

- Clinical and dosimetric planning of Conformal radiation therapy.

- Holding techiquesof Conformal radiation therapy.

- Laying technique patient depending on the localization of the tumor process.

- Methods of evaluating the quality of Conformal radiotherapy.

- To conduct differential diagnostics of tumors of various localizations, justify the clinical diagnosis.

- To assess the weight of the patient, to interpret the obtained clinical-laboratory, instrumental data, to determine the scope and sequence of medical events in radiation therapy.

- To follow the improvement or deterioration of the patient and the suitability of the selected methods of exposure according to the tasks of radiation therapy.

- To determine the medical indications for conformal radiotherapy using knowledge about the physical and radiobiological effects of ionizing radiation on the organism of the patient to select the optimal technique of irradiation.

- To justify the scheme, the plan and tactics of radiation treatment of patients, indications and contraindications for conformal radiotherapy.

- Independently conduct analysis and choose the optimal dosimetric plan within tertiary care.

**The resident should have the skills:**

- Perform pre-topometry when conformal radiotherapy x-ray and computer simulations.

- Clinical and dosimetric planning on conformal radiotherapy.

- Conformal radiotherapy procedures for radiation installations.

- The technique of laying the patient depending on the tumor localization process.

- Methods of quality assessment at conformal radiotherapy.

**4. The thematic plan of lectures**

|  |  |  |
| --- | --- | --- |
| **№** | **Topic name** | **Number**  **of hours** |
| 1 | Physical-technical, clinical, dosimetric, radiobiological rationale for the use of conformal treatment of malignant tumors. | 5 |
| 2 | Indications and contraindications to the use of conformal radiotherapy. The advantages and disadvantages of conformal compared to the remote method of exposure (2D). Theconceptofconformalradiationtherapy. | 5 |
| 3 | The technique of Conformal radiation therapy and its hardware. | 5 |
|  | **Total hours** | **15** |

**5. Thematic plan, content of seminars and exercises**

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| --- | --- | --- | --- |
| **№** | **Topic name** | **Content of the topic** | **Number of hours** |
| 1 | The role and place of Conformal radiation therapy in radiotherapy malignant neoplasms | History of the origin and development of Conformal radiation therapy. The history of development of radiology equipment. The rationale for the use Conformal radiation therapy in irradiation on the basis of physical, technical, clinical, dosimetric, radiobiological data. Indications and contraindications to the use of CFLT in radiation treatment of patients with malignant tumors. | 22 |
| 2 | Conformal radiation therapy of breast cancer | T1-2N0-1M0 stages of the disease after performing organograma operations;  T3-4N0M0 and T1-4N1-3M0 stages of disease after radical mastectomy;  Inoperable locally advanced forms of the disease T1-4N1-3M0 stage. | 22 |
| 3 | Conformal radiation therapy of head and neck tumors | Tumors of the head and neck.  T1-2N0-1M0 stages of the disease after organ operations. T3-4N0M0 and T1-4N1-3M0 stages of disease after radical operations. Inoperable locally advanced common forms of the disease, T1-4N1-3M0 stage. | 22 |
| 4 | Conformal radiation therapy tumors of bones and soft tissues | Tumors of bones and soft tissues  T1-2N0-1M0 disease stages of polivitaminyorganogenesis operations.  T3-4N0M0 and T1-4N1-3M0 stages of disease after radical operations.  Inoperable locally advanced forms of the disease T1-4N1-3M0 stage. | 22 |
| 5 | Conformal radiation treatment for certain forms  of malignant processes | Indications and contraindications in patients with malignant neoplasms of different localizations. | 22 |
| 6 | Conformal radiation therapy oncogynecology diseases | Indications and contraindications, advantages and disadvantages, side effects, their correction and treatment. Technique. Topometry and pre-treatment dosimetry planning. | 22 |
| 7 | Conformal radiation therapy of esophageal cancer | Innovative techniques of irradiation of esophageal cancer.  Indications and contraindications,  advantages and disadvantages | 22 |
| 8 | Conformal radiation therapy colon cancer | Indications for use.  Technique with visualization techniques. Features of radiation protection.  Topometry and pre-treatment dosimetry planning. Side effects. Features protective regime patients following the Conformal radiotherapy. | 22 |
| 9 | Conformal radiation therapy of prostate cancer | Indications for use. Technique procedure with visualization techniques.  The pre-treatment topometry and dosimetric planning.  Possible complications and side effects. | 22 |
| 10 | Questions of rehabilitation of patients with malignant tumors who received Conformal radiation therapy | Possible complications of Conformal radiotherapy. Radiation reaction after conformal radiotherapy. Treatment of acute and deferred radiation-induced reactions and side effects of radiation therapy. | 27 |
|  | **Total hours** | | **225** |

**6. Resident self-study work plan**

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| --- | --- |
| **№** | **Maintenances of independent work of a resident** |
| 1 | Polyclinic reception of patients with the formulation of directions for radiotherapy. |
| 2 | Participation in clinical analysis of patients on consuls in the specialized clinical centers and in the radiological departments of the Institute.  On duty in the department of radiation therapy. |
| 3 | Work in the library, on the Internet.  Forming the portfolio of the resident listener. |
| 4 | Examination of the patients with malignant tumors in the Department of outpatient radiation therapy with self-administered the necessary medical documentation. |
| 5 | Participation in weekly radiology boards. Participation and presentation of clinical cases supervised in patients with gynecological cancer disease on radiological councils of the Institute. |
| 6 | Participated in the preparation and analysis of plans for radiation treatment of patients on a daily radiological discussions - participation at the stages of pre-treatment CT-topographic training of radiological patients; independent contribuye volumes of irradiated targets at the stage of preliminary planning radiation treatment of radiological patients with malignant breast tumors. |
| 7 | Participation in the preparation of patients pre-treatment and at the stage of calculating individual dosimetry planning of tumors of the head and neck. Independent participation in the sessions of conformal radiotherapy equipment Institute. |
| 8 | Rehabilitation of cancer patients with tumors in the core center of the Institute with the conduct of appropriate medical documentation. Interpretation of clinical, laboratory, instrumental, ultrasound, x-ray data in patients receiving radiotherapy. |
| 9 | Participated in the preparation and analysis of plans for radiation treatment of patients with malignant tumors of the esophagus on a daily radiological discussions - participation at the stages of pre-treatment CT-topographic training; independent contribuye volumes of irradiated targets at the stage of preliminary planning radiation treatment of radiological patients. |
| 10 | Part in topographic pre-treatment preparation of oncological patients at the stage of calculation of the individual dosimetric planning. Independent participation in the sessions of conformal radiation therapy apparatus. |
| 11 | Curation of patients with breast tumors in the Department of outpatient radiation therapy administered with appropriate medical documentation. Interpretation of clinical, laboratory, instrumental, ultrasound, x-ray data in patients receiving radiotherapy of the breast. |
| 12 | Participated in the preparation and analysis of plans for radiation treatment of patients with malignant tumors of the prostate on a daily radiological discussions - participation at the stages of pre-treatment CT-topographic training; independent contribuye volumes of irradiated targets at the stage of preliminary planning radiation treatment of radiological patients. |
| 13 | Independent participation in the sessions of high-tech methods of irradiation in breast cancer patients. |
| 14 | Curation of patients with malignant tumors of the bladder, prostate specialized Center of oncourology and in the Department of outpatient radiation therapy administered with appropriate medical documentation. Interpretation of clinical, laboratory, instrumental, ultrasound, x-ray data in patients receiving radiotherapy of the bladder, prostate. |
| 15 | Interpretation of PSA values and evaluation and its dynamics in the process of antitumor therapy of urologic cancer patients. |
| 16 | Individual correction of blood parameters in cancer of different patients receiving radiotherapy. |
| 17 | Individual correction of radiation reactions and side effects of radiotherapy in cancer of different patients receiving radiotherapy. |
| 18 | Registration and submission of abstracts. |
|  | **Total hours - 75** |

**7. A list of visual and other benefites, guidance.**

**8. Assessment of knowledge**

The current and boundary control (monitoring of the resident in the clinic, analysis and filling of medical records, testing, and oral interview).

Final control: exam, including testing, interviews and assessment of practical skills.

**9. Clinical base:** the Center of Oncology, outpatient radiation therapy Center of Onco-urology, Center thoracic, abdominal Oncology, breast health Center, Center for pediatric Oncology, Center for bone tumors and soft tissues.

**10. List of recommended literature:**

1) Trufanov G.Principles and clinical application of radiation therapy / radiation diagnosis and Radiation therapy (tutorial). – SPB, 2005.

2) Vishnevskaya E. Modern principles of combined radiation treatment of cervical cancer // Med.radiology, 1985. No. 9. – P. 63-68.

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4) The Role of radiotherapy in gynecologic oncology./Obninsk, 2-3 APR., 2002. – P. 139-141.

5) Hareyama M., Sakata K., Oouchi A., etc. High-dose-rate versus low-dose-rate intracavitary therapy for carcinoma of the uterine cervix: a randomized trial // Cancer, 2002. – Jan 1, 94(1). – P. 117-124.

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8) Chmielewski E. Radiation therapy of primary breast cancer. // In the book. Clinical mammology.Vol.1 (ed. by V. P. Kharchenko, N. And. Rozhkova). - Moscow, STROM,- 2005.- P. 173-178

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10) Nurgaziyev K.,Baipeisov D., Ismailov S., etc. Information-analytical Bulletin "Statistics of malignant neoplasms from 2004 to 2013.and forecast to 2020 (incidence, mortality and survival)". – Almaty, 2014. – 152 p.

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13) Bohman Y. Manual of Oncology. L.: Medicine, 1989.-464 p.

14) Rostovtsev M. Atlas of radiological and pilings. - 2006.

15) Kharchenko V., Panshin G., Chmielewski E. Radiation therapy for breast cancer. // In the book. Radiological diagnosis of breast diseases, treatment, rehabilitation.- Vol.4.- Moscow, STROM,- 2001.- P. 57-98

16) Moeller T., Reif E. Atlas of sectional human anatomy, for example, CT and MRI slices in 3 volumes (transl. from English.: under the General editorship of Professor G. E. Trufanova). – M.: Medpress-inform, 2008.

Additional literature:

17) TelguziyevaZh, ZholdybaiZh.,Shibanova A., etc. Cervical Cancer – epidemiology, pathogenesis, diagnosis, treatment (literature review) // "Hygiene, epidemiology and immunology" - Almaty, 2011. - №2(48) – S. 12-15.

18) TelguziyevaZh., Goncharova T. Pharmacokinetics of methotrexate in the tumor and in the blood plasma of experimental animals // "Hygiene, epidemiology and Immunobiology". – Almaty, 2011. - №4(50). – P. 161-163.

19) TelguziyevaZh., Philippenko V., ZholdybayZh., Kim S. Application of complex techniques of medical visualization in an estimation chemoradiation therapy of the cervical cancer. // ESTRO Anniversary. – London (UK), 8-12 May 2011. – P. 309.

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21) TelguziyevaZh., Kim S., Bainazarova A. Survival rate of patients with cervical cancer at use of a combination of chemical radiomodificators and radical irradiation // The 18th International meeting of the ESGO. – October 19-22, 2013. - Liverpool, UK. – P. 269.

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28) Telguziyeva Zh.,Filippenko V. Patent №22490 invention «Method of treatment for cervical cancer» (17.05.2010)

29) Telguziyeva Zh.,Filippenko V. Patent №23075 invention «Method of integrated Ultrasound techniques to evaluate the efficiency of combined radiation therapy for cervical cancer» (15.11.2010)

30) TelguziyevaZh., BaimakhashevaA., Filippenko V. etc Patent №23100 on invention «Method of treating patients with cervical cancer» (15.11.2010)

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32) Periodic protocols for diagnosis and treatment of malignant neoplasms (2012, 2015).

33) «The clinical guide to oncology» //Almaty. 2016.

34) Act implementing the master-class «High-tech radiotherapy-radiosurgery» in KazNIIOiR (31.03-04.04.2016)

35) Act implementing the master-class «High-tech radiation therapy radiation oncology (joint master class for radiologists and medical physicists)»in KazNIIOiR (28.06-02.07.2016)

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37) IshkininE., Kim V., IbraimovaM., etc. Radiation treatment of patients with kidney cancer with metastatic bone lesion // V Congress of oncologists and radiologists Kazakhstan-Almaty 2014.-№180-Р.106-107

38) IshkininE., Kim V., Antropova T. etc. Evolutionary development of radiotherapy for prostate cancer in the Republic of Kazakhstan // V Congress of oncologists and radiologists Kazakhstan-Almaty 2014.-No. 181-c. 107

39) Kim V., IshkininE., Almabek A., etc. Pre-radialtopometry training in 3d conformal and intensely-modulated radiation therapy, experiences in Kazakhstan // V Congress of oncologists and radiologists in Kazakhstan. -Almaty, 2014-No. 185-P.109-110

40) Malignant tumors of testicular, prostate cancer, renal cell carcinoma, bladder cancer// Periodic protocols of diagnostics and treatment of malignancies.-Almaty, 2012.-325-377

41) Guide for the target groups of the male population screening for early detection of prostate cancer and ensure its quality// NurgaliyevN.S., ZhylkajdarovaA.Zh., Ishkinin E., edited by m.d. Kyrgyz Republic Shmone, m.d., Prof. M.K. Alchinbaev-revision and additions. -Almaty, 2014. - 71 p. ISBN 978-601-80100-8-8

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The syllabus was developed in accordance with the working curriculum, discussed at the meeting of the Scientific Council of KazNIIOiR (Protocol №7 from «August» 25, 2017).

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