Editorial

Modern Therapy Related Changes in Tumors and Adjacent Normal Tissues

In this supplement of *Open Pathology Journal*, the readers will find several articles dealing with the histopathologic changes induced by modern therapy. Therapy related changes vary from one organ to another and depend on the type of cancer therapy used. They can be seen in treated tumors as well as in the adjacent normal tissues. Overall they form a pathologic spectrum that did not exist prior to the introduction of modern multidrug chemotherapy, high energy radiation therapy, and therapy based on the use of biological agents.

The importance of therapy related histopathologic changes can be discussed under several headings, but most importantly the pathologist must concentrate on the following issues:

- Tumor response to therapy.

  Pathologic examination of the tumor bed is essential for quantitating the extent of necrosis and for the identification of residual tumor cells. In some instances the quantitative data can be expressed as a tumor response grade (TRG), which in case of colorectal carcinomas correlates well with overall patients' survival [1].

- Therapy related changes in the morphology of the primary or metastatic tumor.

  This can be best illustrated in the case of metastatic malignant germ cell tumors [2]. Some of these metastases are composed of benign somatic tissues forming teratomas, not requiring additional therapy. Others are composed of new forms of malignancy such as yolk sac carcinoma or sarcoma which may be resistant to chemotherapy.

- Therapy related atypia in normal tissues.

  These changes must be distinguished from neoplasia to avoid unnecessary additional surgery or chemotherapy [3].

- New forms of neoplasia induced by chemotherapy or radiation therapy.

  Chemotherapy and radiation therapy may directly induce new forms of malignancy, which must be recognized pathologically [4, 5].

- Immunodeficiency related neoplasia.

  Immunodeficiency, be it primary or therapy related, predisposes to neoplasia. Most often it will originate lymphoid or hematopoietic cells but may develop from other organs as well [6]. It is well known that the treatment on non-neoplastic diseases may result in the induction of malignant tumors as well [7].

- Malignancy related to solid organ transplantation.

  An increased incidence of malignant tumors has been recorded after transplantation of most internal organs [8]. The pathogenesis of these tumors is probably a consequence of immunosuppressive treatment and various viral infections. Most common tumors are skin cancer, post-transplant lymphoproliferative disorders, and Kaposi sarcoma.

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The review articles included in the supplement deal mostly with the first three aspects of therapy-related changes listed above. The articles focus primarily on consequences on radiation and chemotherapy, since the consequences of biologic therapy have not been fully documented yet.

These reviews deal mostly with histopathology and are well illustrated. Obviously they were written by pathologists for other pathologists, but we hope that other medical specialists dealing with diagnosis and treatment of cancer will also find them informative and interesting.

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