

## Chernobyl-related Bladder Lesions: New Interpretation Required

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### Abstract

Some aspects of practical pathology in the former Soviet Union, having a potential impact on the diagnostic quality, as well as possible mechanisms of false-positive diagnostics of malignant and premalignant lesions after the Chernobyl accident were discussed previously. In particular, overdiagnosis appears probable in regard to the bladder lesions detected in the radio-contaminated areas. Some studies on the post-Chernobyl bladder lesions are valuable but require new interpretation.

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Some aspects of practical pathology in the former Soviet Union, having a potential impact on the diagnostic quality, were delineated in [1]. Possible mechanisms of false-positive diagnostics of malignant and premalignant lesions after the Chernobyl accident were discussed previously [2, 3].

In particular, overdiagnosis appears probable in regard to the bladder lesions detected in the radio-contaminated areas. In different groups of male patients with benign prostatic hyperplasia (BPH) and females with chronic cystitis, from contaminated areas and Kiev, severe urothelial dysplasia and/or carcinoma in situ were found by bladder biopsy in 56-96 % of all randomly selected cases [4, 5]. In the Handout, distributed at the XXIII International Congress of the International Academy of Pathology on 15-20 October 2000 in Nagoya, Japan, the following was written: "Histologically the different forms of proliferative cystitis, which were frequently combined and had features of irradiation cystitis with multiple areas of severe dysplasia and carcinoma in situ (CIS), sometimes associated with small transitional-cell carcinoma (TCC), occurred in 97 % of patients from the radiocontaminated areas of Ukraine." These percentages appear unrealistic and indicative of false-positivity. In this regard, the illustrations from the article [5], should be commented (compare Fig. 2 and

Fig. 3 available at <http://carcin.oxfordjournals.org/content/30/11/1821.long> Fig. 2. From the caption: "Small developing papillary urothelial carcinoma with severe dysplasia (G-L)" [5] Comment: thick sections; in some plates the nuclei are insufficiently stained. No severe dysplasia is recognizable. A small papilloma or papillary cystitis cannot be excluded. Fig. 3. From the caption: "...dysplasia (A-D) and small papillary urothelial carcinoma (E-G) [5]." Comment: mild to moderate atypia might be present; but neither severe dysplasia nor carcinomas are recognizable. All the slides are apparently too thick for reliable diagnostics.

Insufficient quality of specimens could have been caused also by fixation, processing-related factors and electrocoagulation. The same is true for the similar images in the article [6] available at [http://onlinelibrary.wiley.com/doi/10.1002/\(SICI\)1097-0215\(20000615\)86:6%3C790::AID-IJC6%3E3.0.CO;2-Q/full](http://onlinelibrary.wiley.com/doi/10.1002/(SICI)1097-0215(20000615)86:6%3C790::AID-IJC6%3E3.0.CO;2-Q/full) (all URLs accessed 27 January 2014). The Fig. 2G from [5] and Fig. 4a from the article [6] (Designated as "small developing papillary transitional-cell carcinoma with severe dysplasia" [6]) are identical. Note that overdiagnosis could have entailed over-manipulation and overtreatment. It cannot be excluded that the above-mentioned "Chernobyl cystitis" or "irradiation cystitis"

[5, 7], further characterized by “reactive epithelial proliferation associated with hemorrhage, fibrin deposits, fibrinoid vascular changes, and multinuclear stromal cells” [7] was at least in part caused and/or maintained due to the repeated cystoscopies with mapping biopsies, electrocoagulation etc. Looking at the figures in [8], it appears probable that overdiagnosis of bladder lesions could have happened also earlier.

Accordingly, some of the immunohistochemical and molecular markers, especially those associated with damage, inflammation and cell proliferation (TGF- $\beta$ 1, NF- $\kappa$ B, p38 mitogen-activated protein kinases, growth factors, etc.) as well as the “marked activation of angiogenesis in urinary bladder lamina propria” [5], discussed within the scope of the radiation-related carcinogenesis [5], probably reflect the state of irritation, chronic inflammation and increased cellular proliferation.

Bladder carcinogenesis under the influence of ionizing radiation can be studied in bioassays with exactly known radiation doses and using modern methods as well as equipments. The animals can be subdivided by gender as females might be in general more susceptible to cystitis than males.

In conclusion, the results of some studies on the post-Chernobyl bladder lesions, for example [4-6], are valuable but require new interpretation.

#### CONFLICTS OF INTEREST

The author declares that there are no conflicts of interest.

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