Short Communication

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Frequent Overexpression of p53 in Dysgerminoma of the Ovary

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Key Words

Dysgerminoma
p53
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Abstract

The expression of p53 in 7 dysgerminomas of the ovary was investigated immunohistochemically with the monoclonal antibodies DAKO-p53/Do-7 and Dianova-p53/Do-1. All the tumors exhibited overexpression of p53 protein. Immunoreactive tumor cell nuclei amounted to more than 50% in 2 tumors, 10–50% in 2 tumors, and less than 10% in 3 tumors. No relationship was found between tumor stage and the degree of p53 expression. Overexpression of p53 thus appears to be very common in dysgerminoma, as it is in epithelial ovarian cancer.

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Dysgerminoma is a rare germ cell tumor of the ovary that accounts for 1-2% of primary ovarian tumors and 3-5% of ovarian malignancies [1] and exhibits a characteristic lymphohistiocytic or granulomatous stromal reaction [2]. Little is known about the molecular events that lead to the development of this tumor. The tumor suppressor gene that has been most extensively studied in solid tumors is the p53 gene, which encodes a 53-kD nuclear phosphoprotein with a very short half-life that is present in small amounts in most normal cells [3]. Mutation of the p53 gene is thought to be the most frequent genetic change occurring in human cancers [4]. Because mutant p53 genes in most instances encode proteins with a prolonged half-life, such mutations usually lead to overexpression of p53 protein [5]. To the best of our knowledge, dysgerminoma of the ovary has not previously been investigated for overexpression of p53 protein.

Materials and Methods

Routinely processed (formalin-fixed, and paraffin-embedded) tissue from 7 dysgerminomas was investigated. Sections were cut at 5 µm and immunostained with the recently developed monoclonal antibodies DAKO-p53/Do-7 (DAKO Diagnostika GmbH, Hamburg, FRG) and Dianova-p53/Do-1 (Dianova GmbH, Hamburg, FRG) using the avidin-biotin-peroxidase complex method of Hsu et al. [6].

Results

General Features

The clinical features of the patients and the results of other immunohistochemical investigations performed on the tumors have been described in detail elsewhere [2]. A short summary of the main clinical findings is given in table 1.

Table 1. Dysgerminoma of the ovary: main clinical data and degree of p53 overexpression in 7 cases

USO, unilateral salpingo-oophorectomy; BSO, bilateral salpingo-oophorectomy; LA, lymphadenectomy; HE, hysterectomy; NED, no evidence of disease.

++ = > 50% of tumor cell nuclei stained; + = > 10% and < 50% of tumor cell nuclei stained; (+) = < 10% of tumor cell nuclei stained.

Expression of p53

Immunostaining revealed overexpression of p53 protein in all the tumors. Granular and diffuse reactivity of more than 50% of the tumor cell nuclei was seen in cases 4 and 7 (fig. 1), in 10-50% of the tumor cell nuclei in cases 2 and 3, and in less than 10% of tumor cell nuclei in cases 1, 5, and 6 (table 1). There was no relationship between the FIGO stage and the degree of expression of p53.

Discussion

Overexpression of p53 protein was demonstrated in all the 7 dysgerminomas of the ovary investigated in this study. The proportion of tumor cells with stained nuclei ranged from less than 10% to well over 50%. No correlation was found between the degree of p53 overexpression and the tumor stage. However, larger numbers of this rare tumor would have to be evaluated to enable more definite conclusions to be drawn. To our knowledge, this is the first report concerning the expression of p53 protein in dysgerminoma. Detectable levels of p53 have been found in about 75% of cases of seminoma, which is the isomorphic but more frequent germ cell tumor of the testis. A particularly high proportion of preinvasive lesions was found amongst the positive cases, which suggests that overexpression of p53 could be a relatively early step in the pathogenesis of these tumors [7]. Overexpression of p53 protein has been described in approximately 50% of cases of epithelial ovarian cancer [8]. As in dysgerminoma, no correlation was found between p53 overexpression and stage or histological grade. In the same study no expression of p53 protein was detected in a variety of benign gynecological tissues (2 normal ovaries, 7 benign ovarian serous cystadenomas, 3 specimens of normal endometrium, and 1 fibroid) [8]. Normal and reactively altered ovarian tissue therefore does not appear to contain immunohistochemically detectable levels of p53 protein, but malignant tumors of both epithelial and germ cell origin show marked overexpression of the p53 protein.

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142

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