Activity of Mn –Superoxide Dismutase in Erythrocyte of Patients with Ovarian Epithelioma

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Abstract **Objective** to examine activities of superoxide dismutase (SOD) and Mn-superoxide dismutase (Mn-SOD) in erythrocyte of the patients with ovarian epithelioma and to investigate the defense mechanism. **Methods** The peripheral blood of 85 patients with ovary neoplasm (43 benign cases and 42 malign) ant and 94 healthy people were collected. The activity of SOD was examined with xanthine methods. Then the activity of Mn-SOD was examined after adding potassium chloride to destroy the activity of Cu-SOD and Zn-SOD. The results of these groups were analyzed with analysis of variance. **Results** The activity of SOD and Mn-SOD were not significantly different between healthy people and patients with benign neoplasm. The activity of SOD in patients with ovary cancer was lower than that in patients with benign neoplasm (P<0.05). The activity of Mn-SOD in patients with ovarian cancer was higher than that in healthy people and patients with benign neoplasm (P<0.05), and increased with the clinical stages. The activity of Mn-SOD was higher in tumors with poorly differentiation than that with well differentiation (P<0.05). **Conclusion** The activity of Mn-SOD and SOD, may be retaled to the occurrence, devepopment of ovary cancer.

Key Words superoxide dismutase; Mn-superoxide dismutase; ovarian carcinoma

As we know the free radical is related to the occurrence and development of malignant neoplasm closely. SOD is a defensive system of the human that can avoid the damage of the free radical. However there are some different points about the function of Mn-SOD, we want to discuss the important defensive system through the change of SOD and Mn-SOD in erythrocyte of patients with ovarian epithelioma.

MATERIAL AND METHODS

Clinical materials

Some of data were gotten from the patients that were treated in our department . They were stayed by pathological diagnosis according to FIGO. 43 cases were benign, (serous tumors 16, mucous tumor 23, endometrioid tumor 4). 42 cases were carcinoma(serous carcinoma 29, mucous carcinoma 5, endometrioid carcinoma 6, mesonephric carcinoma 2).

At the same time we chose 94 healthy women as control. The mean age of then is 20.3±12.2 gears old, the benign group is 37.2±14.2 gears old, and the malignant group is 51.2±12.7 gears old.

Samples

All the samples were gotten under the same conditions. One part of the anticogulant blood was used to detect the activity of SOD. The rest was used for the Mn-SOD.

Methods

The activity of SOD was measured by an ultramicroanlytic and rapid assay[1], and the activity of Mn-SOD, 5mmol/L KCN was used to destroy the Zn, Cu-SOD.

Statistic method

Covarian analysis and T-test were used.

RESULTS

The comparison of SOD and Mn–SOD in benign and malignant groups

The activity of SOD in malignant group was lower than that in the normal and benign groups (p<0.05). The activity of Mn-SOD in ovarian carcinoma was higher than that in the other two (p<0.05). No significant difference of the activity of SOD and Mn-SOD between the normal and benign groups(p>0.05). (Tab 1)

The activity of SOD and Mn–SOD in malignant group

According to the differentiation of tissue and clinical stage. 31 of the ovarian carcinoma were classed definitely by pathological diagnosis. 7 of them were poorly differentiation , SOD (1907.3±161.5) NU/L, Mn-SOD (598.8±81.9)NU/L, 24 of them were middle and well differentiation, SOD (2106.4±181.4) UN/L, Mn-SOD (572.8±78.3) UN/L. Both the activity of SOD and Mn-SOD have significant difference between the poorly

Table 1 Activities of SOD and Mn-SOD erythrocyte of the patients in different group. (UN/L, $\bar{x}\pm s$)

Group	n	SOD	Mn-SOD
Control	94	2516.0±206.2	490.5±62.3
Benign tumor	43	2162.3±351.8	498.8±82.7
Malignant tumor	42	1941.9±473.2[1),2)]	582.9±94.81[1),2)]

Note: 1) compared with the control $p<0.05$; 2) compared with the benign individuals $p<0.05$

Table 2 Activity of SOD and Mn-SOD in different clinic states of ovarian malignant tumor(UN/L, $\bar{x}\pm s$)

Clinic stage	n	SOD	Mn-SOD
Ⅰ	7	2225.3±99.7	486.2±11.8
Ⅱ	5	1999.3±106.5	543.3±46.8
Ⅲ+Ⅳ	30	1813.3±110.4[1)]	598.4±76.3[2)]

Note: 1) compared with stage Ⅰ $p>0.05$; 2) compared with stage Ⅰ $p<0.05$

and middle-well differentiation group ($p<0.05$).

There is no significant difference of the SOD between stage Ⅰ and others in ovarian carcinoma group ($p>0.05$). There is significant difference of Mn-SOD between stage Ⅰ and others in ovarian carcinoma group ($p<0.05$). (Tab 2)

DISCUSSION

The damage of superoxide anion can affect the change of tumor cells. The tumor cells can send out hydroperoxide to improve the activity of tumor that included rising the stability of tumor genes and the invasive damage of tumor cells to host tissue[2]. However, the antioxidant such as SOD has defensive effect. They are Zn, Cu-SOD, Mn-SOD and some SOD out of cells. They have been used to diagnose and observe the effect of certain treatment in ovarian carcinoma[3]. Our result of SOD in ovarian carcinoma patients is consistent with the articles[4], But there were no significant difference in different stage. Maybe the lesser number of the samples in certain stages is the reason.

In some research the Mn-SOD in tumor and old tissues is higher than the normal and young. So we can regard the Mn-SOD as one character of the malignant tumor. In the carcinoma cells cultivated in vitro, only one certain cells' Mn-SOD was high[5]. The Mn-SOD in serum is correlated with the stage, progress and treatment effect in gynecology malignant neoplasms[6]. In our research the activity of Mn-SOD was higher in ovarian carcinoma than in normal and benign group. At the same time it was lower in early stage patients than in the rest, and was higher in poor differentiation group than in the others.

We also found that the activity of SOD in ovarian carcinoma was lower but that of Mn-SOD was higher and increased with the disease progress. Taniguchi [2] considered that the increase of SOD may be related to tumor necrosis factor (TNF). And the increase of Mn-SOD can be correlated with TNF and IL-1 which were produced by the macroghagocyte and the tumor cells themselves. TNF and IL-1 may induce to produce the mRNA of Mn-SOD, so the Mn-SOD can be sent to blood. That may be a reflect of body defence, in order to clear out the free radical, diminish the damage of the tumor and prevent its invasion. The other articles reported that the Mn-SOD was higher in ovarian carcinoma than other epithelia gynecologic tumors. And its specificity is better than CA-125. Mn-SOD changed with the effect of the treatment [7]. The further research of the effect of Mn- SOD may contribute to find more sensible and special tumor markers.

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