PO Box 2345, Beijing 100023, China
Fax: +86-10-85381893
E-mail: wjg@wjgnet.com www.wjgnet.com

WJG, 1999 April; 5(2):181-182
World Journal of Gastroenterology
 ISSN 1007-9327

Clinical significance of changes of perioperative T cell and expression of its activatedantigen in colorectal cancer patients

WANG Yi-Xing[1], RUAN Can-Ping[2], LI Li[3], SHI Jing-Hua[2] and KONG Xian-Tao[3]

Subject headings colorectal neoplasms; perioperative period; **T** lymphocytes; surface antigen

INTRODUCTION

Immune function status is corresponded to genesis and progress of tumor, and cell immune plays a major role in anti-tumor immunity. In recent years, there has been more and more interest in the effect of tumor on functional imbalance of T lymphocyte subgroups. In order to study changes of immune status in colorectal cancer patients before and after operation, we determined six kinds of T lymphocyte surface antigens including CD_3, CD_4, CD_8, CD_{16}, CD_{69} and CD_3^+/HLA-DR^+ in 35 patients with colorectal cancer from April 1996 to March 1997, and the results were compared with those in patients with benign diseases.

MATERIAL AND METHODS

Patients

Among the twenty-five patients with benign disease in the control group, sixteen were patients with inguinal hernia, nine with varicose, their average age was 46.61 ± 11.63. They did not take any medicine recently and had no complicat ions. Among the thirty-five patients in the colorectal group, eighteen were mal e and seventeen female. Their average age was 60.13 ± 8.15. All of them were operatedupon, twenty-seven patients received radical resection and eight patients palliative resection. The diagnosis was confirmed by pathological examination.

Material

A murine monoclonal antibody to human CD_3, CD_4, CD_8, CD_{16}, CD_{69} and a double-color fluorescent labeled CD_3-FITC/HLA-DR-PE were purchased from Coulter-Immunotech Company.

[1]Department of General Surgery, Anda Hospital, Pudong New Area, Shanghai 201204, China
[2]Department of General Surgery, Changzheng Hospital, Fengyang Road 415, Shanghai 200003, China
[3]Department of Laboratory Diagnosis, Changzheng Hospital, Fengyang Road 415, Shanghai 200003, China
Correspondence to: WANG Yi-Xing, Department of General Surgery, ?Anda Hospital, Pudong New Area, Shanghai 201204, China
Tel. +86 • 21 • 58918622 Ext. 8888
Received 1998-12-21

Methods

Peripheral vein blood was collected in heparin tubes 3 days before operation in control, 3 days before operation and 10 days after operation in cancer patients respectively. Ten μL- fluorescent labeled antibodies (Coulter) was mixed into 100 μL heparinized blood (or 10^6 cells with nucleus) in a tube. The mixture was incubated at room temperature for 15 min, and was processed in a Q-prep machine and determined in a Coulter Epics XL flow cytometer (Coulter Company, USA) with relative softwares. The Dot Plot was made according to the detected value of the forward scatter light and the side scatter light (at a 90° angle from the laser axis) of flowing cells excita ted by an air-cooled 488 nm argon-ion laser. Green and red emissions of t he lymphocyte group were detected with a 530 nm ± 10 nm bandpass filter and a 515 nm ± 10 nm bandpass filter respectively. The same type of non-fluorecent-labeled murine monoclonal antibodies was used as control in each group of samples. A combination of volt of the photomultiplier tubes (PMT1 and PMT2) was adjusted according to the non-fluorecent-labeled murine monoclona l antibodies to keep background fluorescent below 2% and CD_3/CD_4, color complement was adjusted in permitting width.

Statistical analysis

Data was analyzed by Student's t test and Chi-square test.

RESULTS

Changes of T cell and its subgroups in colorectal cancer patients before and after operation

The results in Table 1 show that: ① CD_3, CD_4 and CD_4/CD_8 were significantly lower in cancer patients before operation than those in control while CD_8 was much higher in cancer patients (P <0.05). ② T cell and its subg roups changed obviously after operation. CD_3, CD_4 and CD_4/CD_8 were sig nificantly higher in cancer patients after operation than those before operation (P<0.05), but CD_8 decreased obviously (P<0.05). No significant difference was found in CD_3, CD_4 and CD_4/CD_8 of the postoperative cancer patients and the controls.

Table 1 Change of T cell and its subgroups in colorectal cancer patients before and after operation (%, $\bar{x} \pm s$)

Groups	Cases	CD_3	CD_4	CD_8	CD_4/CD_8
Control	25	68.41 ± 7.30	39.88 ± 9.11	25.15 ± 7.34	1.79 ± 0.90
Colorectal cancer before operation	35	62.57 ± 7.46[a]	38.81 ± 8.23[a]	30.71 ± 4.03[a]	1.13 ± 0.28a
Colorectal cancer after operation	35	65.38 ± 8.19	37.31 ± 11.47	25.26 ± 5.98	1.69 ± 1.07a

$P<0.05$ *vs* control and colorectal cancer after operation.

Table 2 Expression of T cell activated antigen and CD16 in pat ients with colorectal cancer (%, $\bar{x} \pm s$)

Groups	Cases	CD_{16}	CD_{69}	CD_3^+/HLA-DR^+
Control	25	11.11 ± 6.25	10.98 ± 6.41	4.44 ± 3.22
Colorectal cancer before operation	35	7.37 ± 2.61[ac]	5.99 ± 2.07ac	3.81 ± 1.72c
Colorectal cancer after operation	35	11.62 ± 4.23	10.87 ± 2.81	7.62 ± 3.01b

[a]$P<0.05$; [b]$P<0.01$ *vs* control; [c]$P<0.05$ *vs* colorectal cancer after operation.

Expression of T cell activated antigen and CD16 in patients with colorectal cancer

The results in Table 2 show that: ① CD_{16} and CD_{69} were significantly lower in cancer patients before operation than those in control, and no significant difference was found in CD_3^+/HLA-DR^+ between the postoperative c ancer patients and the control. ② T cell activated antigen CD_{69}, CD_3^+/HLA-DR^+ and CD_{16} increased obviously postoperatively ($P<0.05$). No significant difference was found in CD_{16} and CD_{69} between the postoperative cancer patients and the controls, while CD_3^+/HLA-DR+ was much higher than that in control ($P<0.01$).

DISCUSSION

It was found in the study that CD_3, CD_4, CD_4/CD_8, CD_{69} and CD_{16} on NK cell surface in cancer patients before operation were lower than those in control, but CD_8 was much higher than that in control. The cell immune function decreased significantly in colorectal cancer patients before operation. Elevation of CD_8 was caused by increase of T suppressive cells (Ts), while reduced CD_{16} was due to decrease of NK cells and increase of serum immune suppressive factor along with the tumor growing[1,2]. No statistical difference was found in activated T cell CD_3^+/HLA-DR^+ between the cancer patients before operation and the controls. It might be caused by the on-going of TH cell mediated ADCC effect when TH cell (CD_4) having recognized APC antigen in body with tumor was activated. Though the body immune function was suppressed at different extent, activation of T cell which was important in cell immune was still going on[3].

Both T cell subgroups and T cell activated antigen changed obviously in colorectal cancer patients after operation with CD_3, CD_4/CD_8, CD_{16} and CD_{69} increased significantly, and CD_8 decreased obviously. Except the ac tivated T cell CD_3^+/HLA-DR^+ which was much higher than that in control, no significant difference was found in other parameters between the colorectal cancer patients after operation and the controls. The mechanism is that immune suppres sion in colorectal cancer patient is caused by the soluble immune suppression factor originated from tumors related to differentiation. Since the level of the immune suppression factor decreased, the body immune function and host ant i-tumor immune function recovered gradually after the tumor was resected, strong T cell immune response induced by MHC II antigen HLA-DR activated CD_4 positive T cell to produce cellular factors, and augmented effect of CD_8 or CD_4 positive T cell mediated ADCC[4,5]. Increased CD_3 positive T cell, T help cell and CD_{16} expression, and decreased suppressive T lymphocyte after operation showed that resection of tumor is helpful in improving patient ce ll immune functions. Increased T cell activated antigen CD_{69} and CD_3^+/HLA-DR^+ showed that host cell immune function was enhanced. So we hold that radical or palliative excision of colorectal tumor may be helpful in enhancing patient immune functions and postoperative treatment. Monitoring patient immune status after operation may have definite clinical significance in predicting the prognosis of patients.

REFERENCES

1 Phillips JH, Sanier LL. Dissection of the lymphokine-activated killer phenomenon: relative contribution of peripheral blood nature killer cells and T lymphocytes to cytolysis. *J EXP Med*, 1986;164:814
2 Ortado JR, Manson A, Overton R. Lymphokine-activated killer cells: analysis of progenitors and effectors. *J EXP Med*, 1986; 164:1193
3 Bi AH. Medical immunology. The People's Surgeon Press, *Beijing*, 1996:106
4 Jackson PA, Green MA, Marks CG, King RJB, Hubbard R, Cook MG. Lymphocyte subset infiltration patterns and HLA antigen status in colorectal carcinomas and adenomas. *Gut*, 1996;38:85
5 Peters PJ, Geuze HJ, Van Der HA. A new model for lethal hit delivery by cytotoxic T lymphocytes. *Immunol Today*, 1990;11:28

Edited by WANG Xian-Lin