ECRONICON OPEN ACCESS

EC PAEDIATRICS
Research Article

# Quantitative Aspect of Constitutive Regulation of Immunological Factors by Surgical Operation in Malignant Colon Cancer

**Yasuhiro Nagayoshi[1], Daisuke Sakamoto[1], Yuma Katoh[2], Yujiroh Kojima[3], Nobuo Yamaguchi[3,4] and Shigeru Sakamoto[1]***

[1]*Department of Cardiovascular Surgery, Kanazawa Medical University, Uchinada, Ishikawa, Japan*

[2]*Department of Respiratory Medicine, Tohkai Central Hospital, Gifu, Japan*

[3]*Ishikawa Natural Medicinal Products Research Center, Foundation, Fukubatake, Kanazawa, Ishikawa, Japan*

[4]*Department of Fundamental Research for CAM, Kanazawa Medical University, Uchinada, Ishikawa, Japan*

***Corresponding Author:** Shigeru Sakamoto, Professor Emeritus, Department of Cardiovascular Surgery, Kanazawa Medical University, Uchinada, Ishikawa, Japan.

**Received:** May 30, 2019; **Published:** June 28, 2019

## Abstract

**Background:** Acquired immunodeficiency (AID) may serious to induce many infectious diseases. The purpose of this report was to confirm the one of typical AID about an immunological factors during surgical operation in a malignant colon cancer patient. In this article, we would like to show the immunological factors along with quantitative as well as qualitative aspects around the operation, together with symptom for monitoring therapeutic counselling.

**Methods:** The colon cancer patients diagnosed by 1st and 2nd stages and age matched normal controls were recruited by the issue for colon cancer patient. The monitoring tests were set up for $CD4^+$, $CD8^+$, $CD11b^+$, $CD16^+$ and $CD57^+$ positive cells, and were followed up to 2W, 4W, 12 weeks after the operation. The trials were continued to rule out from anti-cancer chemotherapy and adjusting the time zone so as to coincide the circadian rhythm of leukocyte.

**Results:** The quantitative regulation of total leucocyte number was not seen in both colon cancer patient both age and circadian rhythm matched controls. However, $CD8^+$, $CD11b^+$, $CD16^+$ and $CD57^+$ lymphocytes were drafted significantly around operation. The dynamics of $CD4^+$, $CD8^+$, $CD11b^+$, $CD16^+$ and $CD57^+$ lymphocytes, significant decreases were evident at 2 weeks and 4 weeks after the operation. However, in 12 weeks, the numbers got pretty recovery from that in 4 weeks.

**Conclusion:**

1) CD positive cells were down regulated 2w and 4w after operation.
2) At 12w after the operation, all the CD positive cells we recovered to the levels before operation.
3) Quantitative regulations were also confirmed with T-lymphocyte stimulation.
4) Together with IAP dynamics, these immunological factors might be possible to monitor the therapeutic condition.
5) Both qualitative and quantitative changes were confirmed in the colon cancer patient for select immune-modulators to the patients.

***Keywords:*** *Colon Cancer; Immunological Monitoring; Leucocyte Subset; CD Positive Cells; $CD8^+$; $CD11b^+$; $CD16^+$; $CD57^+$*

## Abbreviations

AID: Acquired Immune Deficiency; APC: Allo-Phycocyanin; CAM: Complementary and Alternative Medicine; FCM: Flow Cytometry; FITC: Fluorescent Isocyanate Conjugate; ECC: Extracorporeal Circulation; CD4: Helper/Inducer T-Cell Marker; CD8: Regulative/Delayed Type Hypersensitive T-Cell Marker; CD16: Cell Surface Marker on the NK Cell Marker; CD57: NK Cell Maker; FCM: Flow Cytometry; FITC: fluorescent Isocyanate Conjugate; VAS: Visual Analog Scale

## Introduction

Despite our defenses system, innate and adaptive in the overwhelming problems of possessing this dual system, the innate and adoptive do not seem to guard or even prevent the development of one internal threat to survival [1]. However, every individual in the world exposes to the risk of immunodeficiency in daily life with both internal and externals. The factors that influence the acquired immune activity are systemic metabolic disorder such as medical side effect in cancer, diabetes mellitus, malnutrition, extreme exhaustion, stress and aging [2-7]. Together with recent advances in understanding the pathogenesis of intestinal cancer and identification of new therapeutic solutions, the management of the disease, especially that of acquired immune-deficient status, remains suboptimal, and this

clinical form is still associated with a high incidence of opportunistic infection by immune-deficient status [8-10]. Several studies reported the acquired immune-deficient condition yet to values persistent for defense systemic network. So, we have to select appropriate menu to regulate immune function through leukocyte storage. The menu has been summarized and listed as CAM: complementary and alternative medicine. In this script, we plan to collect evidence and judge them with the content suggested in the case of immune deficient status and others. In other words, as a judging standard, setting immunologic factors as main items, we will judge superior and inferior of the factors and timing in each physiological factors.

Recommending not only quantitatively, but also qualitatively to evaluate "balance of the lymphocyte which is the associate of the white blood corpuscle and the polymorph" as a standard of the immunological factors. Every creature in the world including human exposes to the risk of immunodeficiency in daily life [11,12].

A vertebrate animal acquired two ontogenically and phylogenically defense systems and ontogenetically, innate and adaptive. Despite these defense systems overwhelming problems of possessing these dual systems, the innate and adoptive does not seem to guard or even prevent the development of one internal threat to survival. Several studies have indicated the immune-modulative, cardio-protective, anti-viral, anti-oxidative, hepato-protective, antitumor, anti-diabetic the activities of the bioactive compounds contained in them. We have been trying to regulate the immune responsiveness through much mature for fragile in daily stress and so on. In this article, we would like to show the regulatory mechanism of the hot spring hydrotherapy. The circumstance, the balneotherapy using the effectiveness of hot-springs hydrotherapy, except for cases of contraindication, has been medically useful approved to be effective in many stress-related disorders and the improvement of dysfunction of the biological rhythm disturbance as well as chronic disease. The mechanism of effects has been reported in many studies, but many things are still unclear. We had prepared the native non-specific gourd line outside of the skin and/or mucous membrane. However, the gourd line is easily broken by accidental affair. However, nonspecific and specific attack system had been prepare as lympho-reticular line of defense.

## Subjects and Methods

### Subjects

### Patient and control

Forty-four patients were enrolled, aged from 40~60 y.o. All of the patients met the predefined diagnostic criteria and selected 1$^{st}$ and 2$^{nd}$ stage in a colon cancer stages. We recruited 15 healthy volunteers in the same ager and informed and consented according to The Ethics Committee of Kanazawa Medical University. The trials were monitored before starting anti-cancer chemotherapy, adjusting the time zone so as to coincide the circadian rhythm of leukocyte.

They were the member of Medical University and the stuff of the Nursly School of Medicine. The attendant were divided in to two group and each group was started after informed consented. We collected peripheral blood from fore arm vein of them before and after the operation, at the same time zone on the day, in adjusting of circadian rhythm of leukocyte and CD positive lymphocyte [19,20]. We asked and charged on the laboratory of Ishikawa Prefecture Preventive Medicine Association for authorized and precise and reliable assessment. The total and differential leukocyte counts were measured by the automated hematology analyzer XE-2100 (Sysmex, Inc., Kobe, Japan).

### Analysis of the CD positive lymphocyte subsets by FCM

The blood withdrawn from the patients and normal volunteer by blood collection tube containing an anticoagulant EDTA-2K. 100 µl of whole blood were added the anti β2-AR antibody (Santa Cruz Biotechnology, Inc. U.S.A.) of the primary antibody and were reacted for 30 minutes at 4°C. M In order to estimate a $CD^+$ cell, the blood was collected from the subjects by blood test tube containing an anticoagulant EDTA-2K. 100 µl of whole blood were mixed with each corresponding antibody. In order to estimate a $CD^+$ cell, the whole blood was collected from the attendants by blood collection tube containing an anticoagulant EDTA-2K. 100 µl of whole blood were mixed with each corresponding antibody. After washing out excessive antibody with PBS, the suspensions were mixed with phycoerythrin (PE)-conjugated streptavidin (Beckman Coulter Inc. France) and fluorescence-activated monoclonal ABs: peridinin chlorophyll protein-cyanin 5.5 (PerCP-Cy5.5)+CD2, fluorescein isothiocyanate (FITC)+CD4, (FITC)+CD8, FITC+$CD11_b$, FITC+CD16, FITC+CD57 (Becton Dickinson Co. U.S.A.), allo-phycocyanin (APC)+CD8, and APC+CD57 (Beckman Coulter). After washing out with Phosphate Buffered Saline, the cell suspensions were fixed employing a X10 diluted Cell FIX (Becton Dickinson) and analyzed by flow cytometer system, FACS Caliber (Becton Dickinson). The negative controls were prepared PE+streptavidin and the isotype control antibodies to the CD antibodies. After incubating for 0.5 hr at 4°C, these samples were hemolyzed abundant RBC with a 10-times dilution FACS Lysing Solution (Becton Dickinson).

### Blast genesis by lymphocyte

Heparinized peripheral blood were also collect totally four times, before operation, 2 weeks after, 4 weeks after and 12 weeks after in a same time zone. After preparing leukocytes, the lymphocytes were incubated by RPMI-1640 for 4 days with phytohemagglutinin-P (PHA) and pulse labelled with $H^3$-thymidine for evaluation by liquid scintillation counter analysis (Shimazu, Co. Ltd. Kyoto, Japan).

### IAP analysis

The serum samples were totally collected four times, before operation, 2 weeks after, 4 weeks after and 12 weeks after prepared in the same time of peripheral blood collection. The serum were stocked -80°C before use. Immuno-suppressive acidic proteins were evaluated for the qualitative condition of the patient by radial immuno assay in agar gel by anti-human immuno-suppressive protein, IAP (Sigma Chemicals, Co Ltd. LA, US).

### Statistical analysis

The statistical analysis along with the groups (before and after trial) for the test of significant difference were calculated by paired t-test and wilcoxon signed-ranks test. As for the examination of the correlation was found a spearman's correlation coefficient by rank test. Data are expressed as means ± standard error of mean (SE). A P value < 0.05 was recorded to be statistically significant. The Kendall tau Rank Correlation and the two-sided p-value were also analyzed.

## Results

### Quantitative aspect of total leukocytes and lymphocytes

The attendant were divided in to two group and each group was started after informed consented according to The Ethics Committee of Kanazawa Medical University. The blood sample were prepared at the same time zone of the first sampling. The number of leukocytes were about the same number between normal volunteer and the patient before operation, $21.6 \pm 4.3 \times 10^2$/and $23.9 \pm 4.7 \times 10^2$/. However, the number of lymphocyte were clearly decreased 2 weeks after operation, $14.2 \pm 3.2 \times 10^2$/ ($P < 0.001$).

Then the number gradually recover to the normal value but still significantly lower than that of normal levels even both in 4 weeks and 12 weeks ($P < 0.001$).

### Blood biochemical parameters

There were no interaction effects between treatment and sampling time for plasma metabolites and humoral immunity ($P > 0.05$) among surgical operation. However, inclusion of operation significantly increased ($P = 0.05$) concentrations of plasma CRP, C-reactive protein of patient comparted by the control group. Also, there was a time effect on LDL-CH as plasma concentrations decreased with time and significantly so on 2W and 4W ($P = 0.017$) of the sampling period. Metabolite concentrations of TP, ALB, GLB, BUN, GLU, TG and HDL-CH, and humoral immune indicators, IgG, IgM, and IgA were not affected ($P > 0.05$) by surgical operation itself.

### $CD4^+$

The attendant were divided in to two group and each group was started after informed consented according to the Ethics Committee of Kanazawa Medical University. The blood sample were prepared at the same time zone of the first sampling. The dynamics of $CD4^+$ lymphocyte, helper/inducer T-cell subsets, significant decrease were seen after 2 weeks ($9.3 \pm 2.1 \times 10^2$/; $P < 0.05$), 4 weeks ($8.0 \pm 1.5 \times 10^2$/; $P < 0.001$) after operation. After the 12 weeks, the number got pretty recovery from 4 weeks after operation, $10.1 \pm 2.8 \times 10^2$/; ($P < 0.001$), (Table 1 and Figure 1).

| **CD4** | | | | **($\times 10^2$)** |
|---|---|---|---|---|
| | **Before Operation** | **2W-PO** | **4W-PO** | **12W-PO** |
| No.1 | 7.6 | 5.6 | 4.7 | 6.5 |
| No.2 | 9.4 | 8.5 | 7.9 | 8.9 |
| No.3 | 14.5 | 10.8 | 9 | 12.4 |
| No.4 | 13 | 11.8 | 10.9 | 15 |
| No.5 | 12.4 | 11.2 | 9.4 | 11.8 |
| No.6 | 5.9 | 5.4 | 4.5 | 5.1 |
| No.7 | 15.2 | 13.8 | 11.5 | 13 |
| No.8 | 7.3 | 5.4 | 5 | 6.2 |
| No.9 | 11.6 | 10.5 | 7.9 | 8.9 |
| No.10 | 15.7 | 12.9 | 11.9 | 16.4 |
| No.11 | 15.2 | 11.3 | 9.4 | 13 |
| No.12 | 8.3 | 6.8 | 6.3 | 8.6 |
| No.13 | 6.4 | 5.3 | 4.9 | 6.1 |
| No.14 | 13.2 | 12 | 9 | 11.3 |
| No.15 | 9.4 | 8.5 | 7.1 | 8.1 |
| **CD8** | | | | **($\times 10^2$)** |

| | Before Operation | 2W-PO | 4W-PO | 12W-PO |
|---|---|---|---|---|
| No.1 | 3.2 | 1.9 | | 4.5 |
| No.2 | 6.6 | 3.7 | | 8.6 |
| No.3 | 4.9 | 2.4 | | 4.7 |
| No.4 | 6 | 3 | | 4.7 |
| No.5 | 5.4 | 3 | | 5.8 |
| No.6 | 3.2 | 2 | | 3.8 |
| No.7 | 6.7 | 3.3 | | 5.9 |
| No.8 | 6.5 | 3.9 | | 8.5 |
| No.9 | 4.3 | 2.6 | | 5.1 |
| No.10 | 5.8 | 2.9 | | 5.1 |
| No.11 | 2.6 | 1.3 | | 2.3 |
| No.12 | 3.6 | 2 | | 3.9 |
| No.13 | 4.8 | 2.9 | | 6.9 |
| No.14 | 3.2 | 1.6 | | 3.4 |
| No.15 | 6.8 | 3.8 | | 8.1 |
| **CD11b** | | | | **($\times 10^2$)** |
| | **Before Operation** | **2W-PO** | **4W-PO** | **12W-PO** |
| No.1 | 1.5 | 0.8 | 1.2 | 2.2 |
| No.2 | 1.2 | 0.7 | 1 | 1.6 |
| No.3 | 0.7 | 0.4 | 0.7 | 1.4 |
| No.4 | 1 | 0.5 | 0.7 | 1.1 |
| No.5 | 1 | 0.6 | 0.8 | 1.5 |
| No.6 | 1.4 | 0.7 | 0.9 | 1.9 |
| No.7 | 1 | 0.6 | 0.9 | 1.7 |
| No.8 | 1.4 | 0.8 | 1.1 | 2 |
| No.9 | 1.3 | 0.7 | 1.2 | 2.2 |
| No.10 | 0.6 | 0.3 | 0.5 | 0.9 |
| No.11 | 0.8 | 0.5 | 0.7 | 1.1 |
| No.12 | 1.4 | 0.7 | 1 | 1.7 |
| No.13 | 1 | 0.6 | 0.8 | 1.5 |
| No.14 | 1 | 0.6 | 0.8 | 1.5 |
| No.15 | 1.1 | 0.6 | 0.9 | 1.4 |
| **CD16+CD57** | | | | **($\times 10^2$)** |
| | **Before Operation** | **2W-PO** | **4W-PO** | **12W-PO** |
| No.1 | 1.2 | 0.5 | 0.5 | 0.7 |
| No.2 | 1.4 | 0.6 | 0.7 | 1.2 |
| No.3 | 2 | 0.8 | 0.9 | 1.3 |
| No.4 | 1.4 | 0.7 | 0.6 | 1 |
| No.5 | 1 | 0.4 | 0.4 | 0.5 |
| No.6 | 1.8 | 0.9 | 0.9 | 1.4 |
| No.7 | 1.2 | 0.5 | 0.4 | 0.6 |
| No.8 | 1.9 | 0.8 | 0.7 | 1.1 |
| No.9 | 1.1 | 0.4 | 0.4 | 0.5 |
| No.10 | 1.4 | 0.5 | 0.5 | 0.8 |
| No.11 | 1.2 | 0.5 | 0.5 | 0.9 |
| No.12 | 1 | 0.4 | 0.5 | 0.6 |
| No.13 | 1 | 0.4 | 0.4 | 0.7 |
| No.14 | 1.4 | 0.6 | 0.7 | 1.1 |
| No.15 | 2 | 1 | 1 | 1.3 |

***Table 1:*** *Analysis of the CD positive lymphocyte subsets by FCM.*

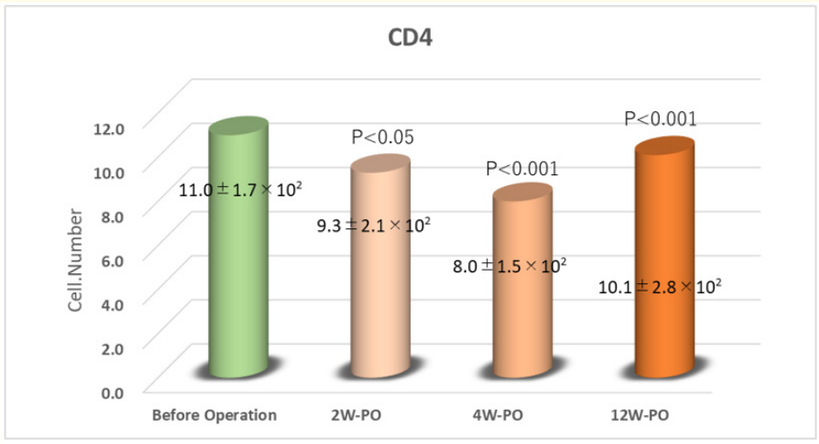


***Figure 1:*** *Quantitative aspect of total lymphocyte CD4+.*

*Forty-four patients were enrolled, aged 40~60. All of the patients met the predefined diagnostic criteria and selected I$^{st}$ and II$^{nd}$ stage in a colon cancer grade. We recruited 15 healthy volunteers in same ager and informed and consented according to The Ethics Committee of Kanazawa Medical University. The trials were monitored before starting anti-cancer chemotherapy, adjusting the time zone so as to coincide the circadian rhythm of leukocyte. In order to estimate a CD$^{+}$ cell, the whole blood was collected from the attendants by blood collection tube containing an anticoagulant EDTA-2K. 100 µl of whole blood were mixed with each corresponding antibody. After washing out excessive antibody with PBS, the suspensions were mixed with phycoerythrin (PE)-conjugated streptavidin (Beckman Coulter Inc. France) and fluorescence-activated monoclonal ABs: peridinin chlorophyll protein-cyanin 5.5 (PerCP-Cy5.5)+CD4, fluorescein isothiocyanate (FITC)+CD4 (Becton Dickinson Co. U.S.A.).*

## CD8$^{+}$

The blood sample were prepared at the same time zone of the first sampling. The dynamics of CD8$^{+}$ lymphocyte, suppressor/effector T-cell, significant down regulation were seen after 2 weeks (2.7 ± 1.4 × 10$^{2}$/; P < 0.001) compare to before operation (4.9 ± 1.8 × 10$^{2}$/), 2 weeks (2.7 ± 1.4×10$^{2}$/; P < 0.001) after operation. After the 12 weeks, the number got pretty recovery from 2 and 4 weeks after operation, 5.4 ± 2.6 × 10$^{2}$/; (P < 0.001), (Table 1 and Figure 2).

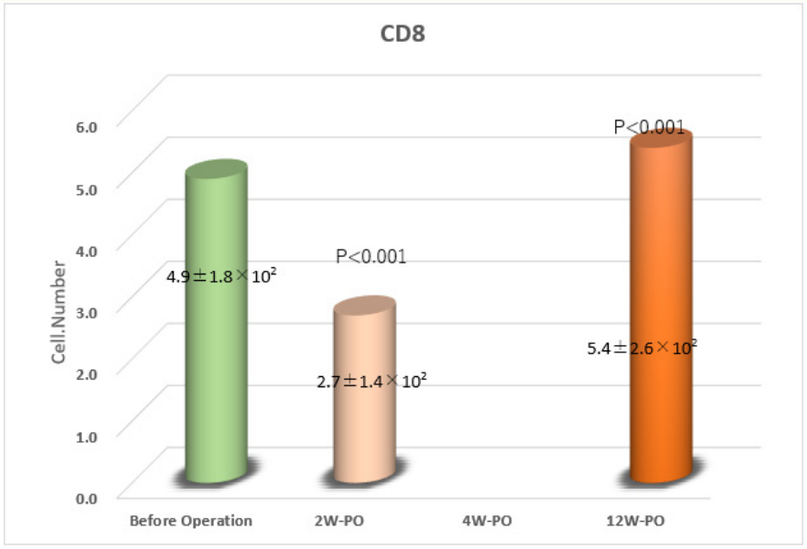


***Figure 2:*** *Quantitative aspect of total lymphocyte CD8$^{+}$.*

*Forty-four patients were enrolled, aged 40~60. All of the patients met the predefined diagnostic criteria and selected Ist and IInd stage in a colon cancer grade. We recruited 15 healthy volunteers in same ager and informed and consented according to The Ethics Committee of Kanazawa Medical University. The trials were monitored before starting anti-cancer chemotherapy, adjusting the time zone so as to coincide the circadian rhythm of leukocyte. In order to estimate a CD+ cell, the whole blood was collected from the attendants by blood collection tube containing an anticoagulant EDTA-2K. 100µl of whole blood were mixed with each corresponding antibody. After washing out excessive antibody with PBS, the suspensions were mixed with phycoerythrin (PE)-conjugated streptavidin (Beckman Coulter Inc. France) and fluorescence-activated monoclonal ABs: peridinin chlorophyll protein-cyanin 5.5 (PerCP-Cy5.5)+CD2, fluorescein isothiocyanate (FITC)+CD8 (Becton Dickinson Co. U.S.A.).*

### CD11b$^+$

The blood sample were prepared at the same time zone of the first sampling. The dynamics of CD11b$^+$ lymphocyte, along with macrophage, significant decrease were seen after 2 weeks ($0.6 \pm 0.2 \times 10^2$/; $P < 0.001$) and 4 weeks ($0.9 \pm 0.4 \times 10^2$/; $P < 0.002$), compare to before operation ($1.1 \pm 0.4 \times 10^2$/). After the 12 weeks, the number got significant recovery from 4 weeks after operation, $1.6 \pm 0.5 \times 10^2$/ (Table 1 and Figure 3).

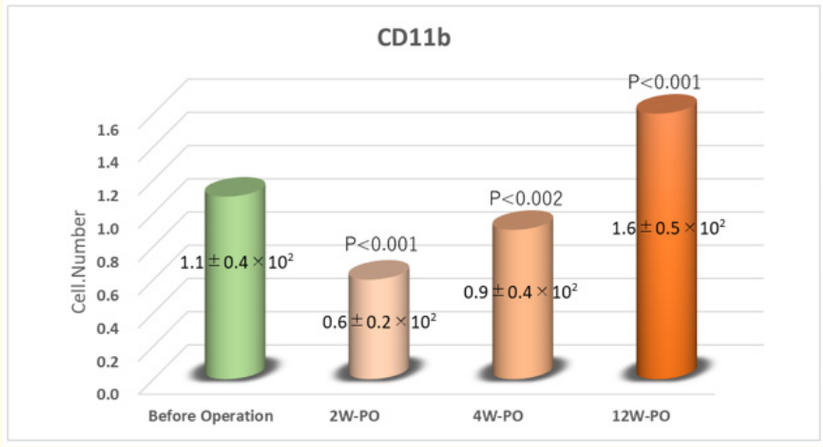


***Figure 3:*** *Quantitative aspect of total lymphocyte CD11b$^+$.*

*In order to estimate a CD+ cell, the whole blood was collected from the attendants by blood collection tube containing an anticoagulant EDTA-2K. 100 µl of whole blood were mixed with each corresponding antibody. After washing out excessive antibody with PBS, the suspensions were mixed with phycoerythrin (PE)-conjugated streptavidin (Beckman Coulter Inc. France) and fluorescence-activated monoclonal ABs: peridinin chlorophyll protein-cyanin 5.5 (PerCP-Cy5.5)+CD2, fluorescein isothiocyanate FITC+CD11b, (Becton Dickinson Co. U.S.A.).*

### CD16$^+$ + CD57$^+$

The blood sample were prepared at the same time zone of the first sampling. The dynamics of CD16$^+$ + CD57$^+$ lymphocyte, natural killer cell markers, significant decrease were seen after 2 weeks ($0.6 \pm 0.2 \times 10^2$/; $P < 0.001$), 4 weeks ($8.0 \pm 1.5 \times 10^2$/; $P < 0.001$) after operation. After the 12 weeks, the number got pretty recovery from 2 weeks after operation, $0.6 \pm 0.7 \times 10^2$/; ($P < 0.001$) (Table 1 and Figure 4).

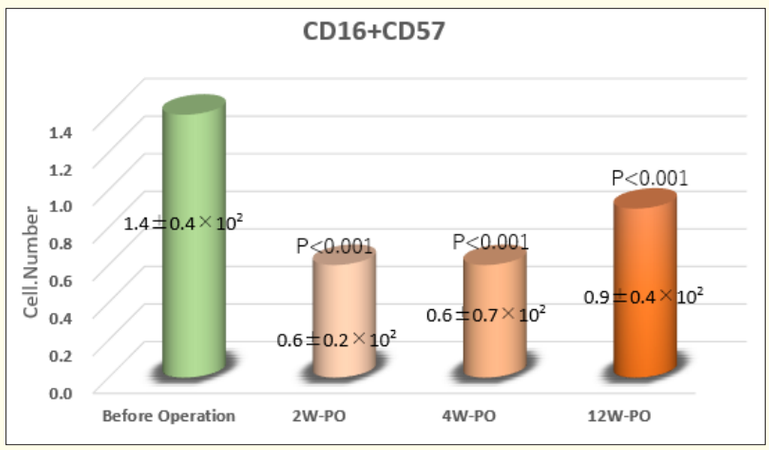


***Figure 4:*** *Quantitative aspect of Total Lymphocyte CD16+CD57.*

*In order to estimate a CD+ cell, the whole blood was collected from the attendants by blood collection tube containing an anticoagulant EDTA-2K. 100 µl of whole blood were mixed with each corresponding antibody. After washing out excessive antibody with PBS, the suspensions were mixed with phycoerythrin (PE)-conjugated streptavidin (Beckman Coulter Inc. France) and fluorescence-activated monoclonal ABs: peridinin chlorophyll protein-cyanin 5.5 (PerCP-Cy5.5)+CD2, fluorescein isothiocyanate FITC+CD16, FITC+CD57 (Becton Dickinson Co. U.S.A.).*

## Qualitative aspect of total lymphocyte

### Blastgenesis assay

The blastgenesis assay was enrolled in this report as a qualitative factor for the lymphocytes. A phytohemagglutinin-P (PHA) was selected as T-cell activator and cultured in $CO_2$ incubator for 4 days followed by preparation for liquid-scintillation counting. This qualitative assay for T-lymphocyte indicated that significant decrease were seen after 2 weeks and 4 weeks, compare to before operation ($P < 0.05$). After the 12 weeks, the level got significant recovery from 2 weeks after operation (Table 2).

| **Blast genesis (For T-cell)** | | | | |
|---|---|---|---|---|
| | **Before Operation** | **2W-PO** | **4W-PO** | **12W-PO** |
| No.1 | 20% | 7% | 22% | 32% |
| No.2 | 34% | 15% | 51% | 73% |
| No.3 | 42% | 16% | 57% | 82% |
| No.4 | 43% | 15% | 52% | 83% |
| No.5 | 16% | 6% | 19% | 31% |
| No.6 | 37% | 16% | 56% | 89% |
| No.7 | 15% | 5% | 16% | 26% |
| No.8 | 22% | 9% | 26% | 38% |
| No.9 | 38% | 13% | 46% | 67% |
| No.10 | 20% | 8% | 24% | 38% |
| No.11 | 22% | 8% | 24% | 35% |
| No.12 | 37% | 16% | 44% | 64% |
| No.13 | 35% | 14% | 48% | 68% |
| No.14 | 32% | 11% | 35% | 50% |
| No.15 | 23% | 9% | 28% | 44% |
| **IAP** | | | | **ug/ml** |
| | **Before Operation** | **2W-PO** | **4W-PO** | **12W-PO** |
| No.1 | 619 | 434.1 | 338.3 | 219.3 |
| No.2 | 903.9 | 704.4 | 549 | 323.5 |
| No.3 | 786 | 551.3 | 477.4 | 253.2 |
| No.4 | 874.4 | 681.4 | 649.1 | 420.7 |
| No.5 | 560 | 392.8 | 374.2 | 220.5 |
| No.6 | 687.8 | 535.9 | 417.7 | 270.8 |
| No.7 | 599.3 | 467 | 404.5 | 214.5 |
| No.8 | 540.4 | 379 | 328.2 | 174.1 |
| No.9 | 884.3 | 758 | 722 | 382.9 |
| No.10 | 569.9 | 399.7 | 346.1 | 183.5 |
| No.11 | 776.2 | 665.3 | 633.8 | 373.5 |
| No.12 | 334.1 | 234.3 | 223.2 | 144.7 |
| No.13 | 599.3 | 420.3 | 400.4 | 212.3 |
| No.14 | 402.8 | 313.9 | 244.7 | 129.7 |
| No.15 | 697.6 | 489.2 | 423.7 | 274.6 |

***Table 2:*** *Qualitative aspect of total lymphocyte by blastgenesis assay and IAP.*

### IAP: Immunosuppressive acidic protein

In order to assess the functional aspect of the immunological condition, IAP was followed before and after the operation that was reported in patients after surgical operation and cancer condition. IAP was induced significantly, 2 weeks of operation. However, the value was decreased from 4 weeks and became the same levels in 12 weeks after the colon cancer operation (Table 2).

## Discussion

The surgical management of colon cancer has witnessed a considerable evolution in the past few decades. Breast conserving therapy is the mainstay treatment for early stage colon cancer at the time being [13]. The advent of onco-plastic surgery has brought new dimensions to breast conserving surgery and included the aesthetic principles of breast surgery to cancer management [14]. The significant developments in the surgical management of colon cancer have been paralleled by similar advancements in reconstructive surgery. Earlier when mastectomies where prevailing, it made perfect sense to look for flaps with large volumes of tissue and muscle bulk such as the TRAM or the conventional LD flaps. The harvest of these flaps often left significant morbidities such as the abdominal wall weakness and the seroma in the back. Nowadays the abdominal surgeon is more than often faced with smaller defects for which such bulky flaps offer a surplus of tissue with unacceptable morbidities compared to the smaller defects these flaps have to reconstruct.

Improvements in our knowledge of the vascular anatomy have enabled the design of a new type of cutaneous flaps, which are based on perforating vessels only [15]. Thus, donor site morbidity is markedly reduced.

Several studies have shown that phytogenic based feed additives could increase villi length and decrease crypt depth in the jejunum and colon [16,17]. Apparent digestibility of protein may be increased by improving the digestive capability of the pre-cecum since the dominant proportion of total fecal protein is bacterial proteins. An improved digestive capability decreases the flux of fermentable material into the hindgut and consequently decreasing effect for microbial growth and fecal bacterial [18]. Also, most medicinal plants have been reported to contain essential oils that may improve nutrients digestibility in animals [19]. This variation with the present study may have been due to the different total feeding time periods concerned in the two experiments. Dietary activity affect digestion, metabolism and microbial activity in animals [20]. In the present study, the inclusion of dietary ABP resulted in a decreased apparent digestibility in the dietary groups and increased apparent ether extract digestibility. Similar results were reported that replacement of Lucerne hay with Pistachio by-product either partially or fully decreased the apparent NDF and increased ether extract digestibility in sheep. It is worth noting that decreased dietary potential did not affect cellulolytic bacteria in the rumen of lactating [21]. In the present study, the levels of NDF in the treatment groups were higher than this amount. The decreased NDF digestibility may have been due to the increase in fiber content.

An important indicator of humoral immunity in animals is the level of plasma antibodies which mainly include immunoglobulins G (IgG), M (IgM) and A (IgA). They defend the extravascular compartment against pathogenic viruses and microorganisms. Several flavonoid containing herbal medicines including CAM have been reported to enhance immune function [22-24]. Furthermore, previous research has indicated that polysaccharides could enhance humoral immunity. In the present study, dietary ABP inclusion did not affect the humoral immune response in sheep. A possible reason could be that ABP levels in the present study were suboptimal. Similar findings were reported that humoral immunity indicators IgG, IgM, and IgA were not affected when 2.5, 5.0, and 7.5% pulverized CAM stem and leaf fiber were fed to weaned pigs. This result suggests that some CAM supplementation has no adverse effect on the immune integrity of patient.

## Conclusions

The findings of the current experiment suggest that surgical operation to colon cancer patient had down-regulated effects on immunological factors quantitatively and qualitatively. Additionally, no adverse effects on the production performance and immunity traits in patients were recorded according to the results of the present study. It can be concluded that it is more useful to approve to as a novel natural immunity systems similar to those of acquired immune deficiency, as opposed to disposal by piling and/or burning which causes serious physiological effect, defense mechanism.

## Disclosure Statement

The authors affirm that there are no conflict of interest and had no financial interest to the issue of this report.

## Bibliography

1. Yamaguchi N., *et al*. "Aspect of QOL Assessment and Proposed New Scale for Evaluation". *Open Journal of Immunology* 5 (2015): 147-182.

2. Miyazaki S. "Immunodeficiency in Clinical Origin". *Clinical Pediatrics* 1 (1977): 1001-1006.

3. Kishida K., *et al*. "Cranial Irradiation and Lymphocyte Subpopulation in Acute Lymphatic Leukemia". *Journal of Pediatrics* 92.5 (1978): 785-786.

4. Yamaguchi N., *et al*. "Maternal Bias of Immunity to Her Offspring: Possibility of an Autoimmunity Twist out from Maternal Immunity to Her Young". *Open Journal of Rheumatology and Autoimmune Diseases* 3 (2013): 40-54.

5. Murgita RA and Tomasi Jr TB. "Suppression of the Immune Response by Alpha-Fetoprotein". *The Journal of Experimental Medicine* 141.2 (1975): 269-286.

6. Paul G., *et al*. "CD4+ but Not CD8+ T Cells Are Required for the Induction of Oral Tolerance". *International Immunology* 7.3 (1995): 501-504.

7. Koshimo H., *et al*. "Maternal Antigenic Stimulation Actively Produces Suppressor Activity in Offspring". *Developmental and Comparative Immunology* 13.1 (1989): 79-85.

8. Braunwald E and Bristow MR. "Congestive heart failure: fifty years of progress". *Circulation (Baltimore)* 102.20 (2000): 14-23.

9. Koa M., *et al*. "Natural Killer Activity and Serum Immunosuppressive Acidic Protein Level". *Esophageal and Gastric Cancers* 23.8 (1993): 699-674.

10. Shigetoyo Saji S., *et al*. "Impact of Splenectomy and Immunochemotherapy on Survival Following Gastrectomy for Carcinoma: Covariate Interaction with Immunosuppressive Acidic Protein, A serum Marker for the Host Immune System. Tumor Marker Committee for the Study Group of Immunochemotherapy with PSK for Gastric Cancer". *Surgery Today* 29.6 (1999): 504-310.

11. Abo T., *et al*. "Studies on the Bioperiodicity of the Immune Response. I. Circadian Rhythms of Human T, B and K Cell Traffic in the Peripheral Blood". *The Journal of Immunology* 126.4 (1988): 1360-1363.

12. Abo T and Kumagai T. "Studies of surface immunoglobulins on human B lymphocytes. Physiological variations of Sig+ cells in peripheral blood". *Clinical Experimental Immunology* 33.3 (1978): 441-452.

13. Waleed Abdel Fattah Fahmy. "The Effect of Using Some Physical Therapy and Rehabilitation Exercises on the Functional and Physical Condition after One Month and a Week of Open Heart Surgery (ECR)". *EC Cardiology* 5.7 (2018): 415-444.

14. Daniel da Costa Torres and Priscila Maria. "Effectiveness of an early mobilization program on functional capacity after coronary artery bypass surgery: A randomized controlled trial protocol". *SAGE Open Medicine* 4 (2017): 2050312116682256.

15. Lee JY., *et al*. "Impact of participation in cardiac rehabilitation on long-term survival after coronary artery bypass graft surgery". *Circulation* 130.2 (2014): A18567.

16. CJ Hsuabc and SY Chen. "The Effect of Early Cardiac Rehabilitation on Health-Related Quality of Life among Heart Transplant Recipients and Patients with Coronary Artery Bypass Graft Surgery". *Transplantation Proceedings* 43.7 (2011): 2714-2717.

17. Alexiev A and Terziev A. "Effects of an Early Cardiac Rehabilitation Following Heart Surgery in Patients Over 70 Years". *SM Journal of Clinical Medicine* 3.1 (2017): 1019.

18. Thijs MH Eijsvogels and Silvana Molossi. "Exercise at the Extremes The Amount of Exercise to Reduce Cardiovascular Events". *Journal of the American College of Cardiology* 67.3 (2016): 316-329.

19. Shuhei Yamamoto and Kazuki Hotta. "Effects of resistance training on muscle strength, exercise capacity, and mobility in middle-aged and elderly patients with coronary artery disease: A meta-analysis". *Journal of Cardiology* 68.2 (2016): 125-134.

20. Phil Page. "Current concepts in muscle stretching for exercise and rehabilitation". *The International Journal of Sports Physical Therapy* 7.1 (2012): 109-119.

21. Stephan Gielena M and Harold Laughlin. "Exercise Training in Patients with Heart Disease: Review of Beneficial Effects and Clinical Recommendations". *Progress in Cardiovascular Diseases* 57.4 (2015): 347-355.

22. Huang D., *et al*. "Optical coherence tomography". *Science* 254.5035 (1991): 1178-1181.

23. Kubo T., *et al*. "Assessment of culprit lesion morphology in acute myocardial infarction: ability of optical coherence tomography compared with intravascular ultrasound and coronary angioscopy". *Journal of the American College of Cardiology* 50.10 (2007): 933-939.

24. Ali ZA., *et al*. "Optical coherence tomography compared with intravascular ultrasound and with angiography to guide coronary stent implantation (ILUMIEN III: OPTIMIZE PCI): a randomized controlled trial". *Lancet* 388.10060 (2016): 2618-2628.

**Volume 8 Issue 7 July 2019**