Original Article
Effects of psychiatric nursing on postoperative recovery of breast cancer patients and its effect on serum IGF-1, IL-6 and CCL-18

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Abstract: Objective: To explore the effect of psychiatric nursing on postoperative recovery of patients with breast cancer and the effects on insulin growth factor (IGF-1), interleukin 6 (IL-6) and chemokine ligand-18 (CCL-18). Methods: 106 patients who underwent breast cancer resection in our hospital from 2013.7 to 2015.7 were enrolled. 58 patients were randomly included into the control group receiving routine nursing while 48 patients were additionally given psychiatric nursing. Postoperative blood pressure, blood glucose, length of hospital stay, 2-year recurrence rate were recorded in two groups; Health knowledge awareness scores, healthy behaviors and negative emotions were evaluated before and after intervention; Serum IGF-1, IL-6 and CCL-18 1 week and 1 month after surgery were compared. Results: The recovery time of blood pressure, blood glucose and length of hospital stay were shorter in observation group than in the control group (P<0.05), and the recurrence rate was lower than that of the control group (P<0.05). The health behaviors, anxiety and depression scores of the observation group were better than those of the control group 1 month after surgery (P<0.05). One week after surgery, the serum IGF-1, IL-6 and CCL-18 levels in the observation group and the control group were not significantly different (P>0.05). After 1 month, the IL-6 level in the observation group was higher and IGF-1, CCL-18 levels were lower than those of the control group (P<0.05). The health knowledge awareness scores of the two groups increased after the nursing, and they were higher in the observation group than in the control group (P<0.05). The nursing satisfaction of the observation group was also higher than that of the control group (P<0.05). Conclusion: Psychiatric nursing can promote postoperative recovery of breast cancer patients, improve immune ability, psychological state, nursing satisfaction and reduce the recurrence rate.

Keywords: Psychological care, breast cancer, insulin growth factor, interleukin 6, chemokine ligand-18

Introduction
The pathogenesis of breast cancer is very complicated. A large amount of evidence shows that multiple chemokines may be released in the tumor microenvironment, such as IGF-1 and CCL-18, which plays an important role in the development and metastasis of tumors [1, 2]. IGF-1 is a peptide substance synthesized by the liver [3]. It is produced and secreted by local tissue cells such as bone marrow and various tumor cells. It can promote the occurrence and the metastasis of tumors. CCL-18 is mainly a chemokine produced by tumor-associated macrophages, which is involved in the immune response of the host to tumors, and has been confirmed to be present in various malignant tumors, such as ovarian cancer and gastric cancer, glioma and breast cancer [4, 5]. Postoperative care after breast cancer surgery can help cancer patients build confidence in survival and enhance their understanding of the disease, and increase treatment compliance, which has positive effects on postoperative rehabilitation [6]. In recent years, psychiatric nursing intervention has been widely used in the nursing work of patients with breast cancer surgery and has achieved remarkable effects. Wei et al. showed that psychiatric nursing intervention can significantly improve the quality
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of life and psychological status of patients with breast cancer surgery [7]. However, there are few clinical reports on the effect of psychiatric nursing on serum IGF-1 and CCL-18 of breast cancer patients. In view of this, this study explored the impact of psychiatric nursing on postoperative recovery of breast cancer patients and serum IGF-1, IL-6, and CCL-18 levels.

Material and methods

Baseline data

A total of 106 female patients admitted to The First People’s Hospital of Wenling from 2013.7 to 2015.7 for breast cancer surgery were enrolled. Among them, 58 cases were randomly included in the control group, with an average age of (48.51±11.62) years and an average course of (25.36±3.74) months; 48 cases were enrolled in the observation group, with an average age of (47.21±9.92) years and an average course of (25.67±3.52) months. Inclusion criteria: patients with breast cancer confirmed by surgical pathology and met WHO diagnostic criteria for breast cancer [8]; aged 18-70 years old; voluntarily signed informed consent. This study has been approved by the Ethics Committee of the First People’s Hospital of Wenling. Exclusion criteria: patients with cognitive dysfunction; patients with mental illness; patients with other primary malignant tumors; poor compliance.

Methods

Control group was cared with dietary guidance, explained of surgery-related precautions, medication guidance, etc. The observation group was additionally given psychiatric nursing on the basis of routine nursing. After patient admission, the nursing staff first introduced the ward layout to eliminate its strangeness and maintain a good relationship with patients. Nurses actively communicate with the patient to learn her personality, hobbies, family, illness, lifestyle habits as well as the psychological problems, and conduct psychological assessment. Psychiatric nursing should be strengthened in patients with negative emotions, for example, targeted nursing programs should be formulated according to the condition of patients. Breast cancer, surgery and other related knowledge were explained in detail to patients and their families so that patients understand the value of treatment to get out of fear with good treatment compliance. In the communication process, nurses should be an active listener and kindly answer questions raised by the patient, offering encouragement, support and comfort, sharing some successful cases to improve the patient’s confidence in treatment. Meanwhile, the relationship between emotions and disease condition should be explained to encourage patients to face the disease and treatment optimistically, and build confidence. In addition, the nursing staffs should divert the patient’s attention through chatting, listening to music, etc. to relieve the patient’s discomfort. Finally, the nursing staffs explained the importance of family support to the patient’s family, so that the patient felt the warmth and support from the family.

The serum IGF-1, IL-6 and CCL-18 were detected using Elisa (Sigma Company).

Evaluation standard

(1) Normal systolic blood pressure: 90 mmHg~140 mmHg; Normal diastolic blood pressure 60 mmHg~90 mmHg.

(2) Blood glucose: 3.90~6.10 mmol/L.

(3) Health scoring standard: Patients are scored according to the Health Promotion Lifestyle Scale (HPLP-II) after surgery. The higher the total score, the better the health status. The anxiety self-assessment scale (SAS) and the depression self-assessment scale (SDS) were used to evaluate patients’ anxiety and depression before and after surgery, respectively. The higher score indicates the greater negative impacts.

(4) Health knowledge awareness: The self-made health knowledge questionnaire was used to assess patients’ health knowledge awareness before and after the intervention, with a total score of 0-100 points. The higher score indicates the better health knowledge awareness.

(5) Nursing satisfaction: A self-made nursing satisfaction questionnaire was used to evaluate patient nursing satisfaction after the surgery. It consisted of nursing quality, interpersonal communication, nursing attitude, etc.,
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with a total score of 0-50 points, of which 46-50 points were very satisfactory, 40-45 points are satisfied, <40 points are dissatisfied, nursing satisfaction rate is the sum of very satisfied rate and satisfaction rate.

Statistical analysis

All data were processed by SPSS22.0. GraphPad Prism 6 software was used to draw statistical graphs. Measurement data were represented by ($\bar{x} \pm s$), and independent sample t test was used for intergroup comparison and paired sample t test was used for intragroup comparison. Count data were examined by $\chi^2$ test. $P<0.05$ denotes significant difference [9].

Results

Comparison of general information

Among the 58 cases in the control group, there were 5 cases of carcinoma in situ, 38 cases of invasive ductal carcinoma, 8 cases of invasive lobular carcinoma, 5 cases of mixed carcinoma, and 2 cases of tubular mucinous carcinoma; while among the 48 cases in the observation group, there were 4 cases of carcinoma in situ, 31 cases of invasive ductal carcinoma, 7 cases of invasive lobular carcinoma, 4 cases of mixed carcinoma and 2 cases of tubular mucinous carcinoma. There was no significant difference in age, course of disease, and pathological type between the two groups ($P>0.05$), which was comparable.

Comparison of postoperative blood pressure, blood glucose and length of hospital stay

The time to recovery of blood pressure, blood glucose and length of hospital stay of the control group were longer than those of the observation group ($P<0.05$). It suggested that psychiatric nursing helps to promote postoperative recovery of breast cancer patients (Figure 1).

Comparison of 2-year recurrence rate following surgery

The recurrence rate of the observation group was lower than that of the control group ($P<0.05$), and there was no significant difference between the two groups in terms of disease exacerbation rate and mortality ($P>0.05$). It indicated psychiatric nursing can effectively reduce 2-year recurrence rate of breast cancer (Table 1).

Comparison of health behaviors and negative emotion scores

There were no statistical differences between the two groups in terms of health awareness, mental growth, physical activity, interpersonal

Table 1. Comparison of two-year recurrence in two groups (n, %)

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Recurrence</th>
<th>Worsen</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>58</td>
<td>11 (19.0)</td>
<td>3 (5.2)</td>
<td>3 (5.2)</td>
</tr>
<tr>
<td>Observation group</td>
<td>48</td>
<td>4 (8.3)</td>
<td>2 (4.2)</td>
<td>1 (2.1)</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>--</td>
<td>4.857</td>
<td>0.112</td>
<td>1.366</td>
</tr>
<tr>
<td>$P$</td>
<td>--</td>
<td>0.028</td>
<td>0.738</td>
<td>0.243</td>
</tr>
</tbody>
</table>

Figure 1. Comparison of postoperative blood pressure, blood glucose and hospital stay in two groups. The time to recovery of blood pressure (A), blood glucose (B) and length of hospital stay (C) of the observation group were shorter than those of the control group. Note: Compared with the control group, *$P<0.05$, **$P<0.01$. 

Table 1. Comparison of two-year recurrence in two groups (n, %)

<table>
<thead>
<tr>
<th>Group</th>
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<tr>
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<td>48</td>
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<td>2 (4.2)</td>
<td>1 (2.1)</td>
</tr>
<tr>
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</tr>
<tr>
<td>$P$</td>
<td>--</td>
<td>0.028</td>
<td>0.738</td>
<td>0.243</td>
</tr>
</tbody>
</table>
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Table 2. Comparison of postoperative health behaviors (X ± s)

<table>
<thead>
<tr>
<th>Group</th>
<th>Health awareness</th>
<th>Mental growth</th>
<th>Physical activity</th>
<th>Interpersonal communication</th>
<th>Stress resistance</th>
<th>Total score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>1.98±0.32</td>
<td>2.12±0.32</td>
<td>2.65±0.32</td>
<td>1.98±0.18</td>
<td>2.11±0.22</td>
<td>10.12±0.65</td>
</tr>
<tr>
<td>Observation group</td>
<td>2.23±0.22</td>
<td>2.34±0.33</td>
<td>2.76±0.32</td>
<td>2.13±0.21</td>
<td>2.26±0.31</td>
<td>13.21±0.58</td>
</tr>
<tr>
<td>t</td>
<td>4.124</td>
<td>4.324</td>
<td>5.542</td>
<td>5.265</td>
<td>4.126</td>
<td>9.032</td>
</tr>
<tr>
<td>P</td>
<td>0.212</td>
<td>0.235</td>
<td>0.097</td>
<td>0.186</td>
<td>0.326</td>
<td>0.029</td>
</tr>
</tbody>
</table>

Table 3. Negative emotion scores after operation (X ± s, minutes)

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Stage</th>
<th>SAS score</th>
<th>SDS score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>58</td>
<td>Preoperative</td>
<td>65.4±13.5</td>
<td>54.6±13.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postoperative</td>
<td>54.6±10.6</td>
<td>48.4±7.5</td>
</tr>
<tr>
<td>Observation group</td>
<td>48</td>
<td>Preoperative</td>
<td>66.1±12.8</td>
<td>55.7±14.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postoperative</td>
<td>43.2±9.8</td>
<td>38.9±6.3</td>
</tr>
</tbody>
</table>

Note: Compared with postoperative, *P<0.05, compared with control group, #P<0.05.

Discussion

Breast cancer is a gynecological cancer disease with high incidence worldwide. It is characterized by breast lumps and nipple discharge, which seriously affect the health and quality of life of female patients. Occurrence of breast cancer is not only influenced by the environment, but also genetic factors, and there are still inconclusive factors [10, 11]. Breast cancer patients often experience negative emotions, such as despair and fear due to lack of knowledge about breast cancer and treatment options. If the breast is removed, it will increase the patient’s anxiety, depression and other negative emotions. Therefore, many patients refuse treatment, seriously affecting the treatment effect [12-14]. Alleviating the negative emotions such as fear, anxiety, and depression in patients receiving breast cancer surgery is of great significance for improving the compliance of the patients and improving the therapeutic effect [15].

The results of this study found that recovery time of blood pressure, blood glucose and hospitalization time of the observation group were shorter than the control group, and the 2-year recurrence rate of the observation group was lower than that of the control group. The health behavior, anxiety and depression scores of the observation group were better than those of the control group 1 month after surgery. The SAS score, SDS score, and health knowledge awareness score of the observation group after...
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Table 4. Negative emotion scores after operation (x ± s, minutes)

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Stage</th>
<th>Health knowledge awareness score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>58</td>
<td>Before intervention</td>
<td>59.6±12.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After intervention</td>
<td>78.5±13.2*</td>
</tr>
<tr>
<td>Observation group</td>
<td>48</td>
<td>Before intervention</td>
<td>56.7±11.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After intervention</td>
<td>89.7±9.5*#</td>
</tr>
</tbody>
</table>

Note: Compared with postoperative, *P<0.05, compared with control group, #P<0.05.

Table 5. Comparison of nursing satisfaction (n, %)

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Very satisfied</th>
<th>Satisfaction</th>
<th>Dissatisfied</th>
<th>Satisfaction rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>58</td>
<td>30 (51.7)</td>
<td>15 (25.9)</td>
<td>13 (22.4)</td>
<td>45 (77.6)</td>
</tr>
<tr>
<td>Observation group</td>
<td>48</td>
<td>32 (66.7)</td>
<td>12 (25.0)</td>
<td>2 (4.2)</td>
<td>46 (95.8)</td>
</tr>
</tbody>
</table>

χ² = 7.198, P = 0.007

The high concentration of blood sugar destroys the body’s normal internal environment and disrupts the signal transmission between signal pathways, increasing the risk of other organ dysfunctions [18]. It also causes damage to peripheral nerves, induces hyperglycemia, dyslipidemia, and metabolic inflammation as well as numbness and abnormal reactions in the limbs, and changes in the concentration of some proteins [19]. Some serum proteins have a certain correlation with the condition changes of breast cancer. IGF-1 maintains the normal expansion and movement of cells, and a high concentration of IGF-1 can promote the proliferation of cancer cells [20, 21]. IL-6 can stimulate the activity of immune cells, improve immune function, delay the aging of tissues and organs and reduce inflammation level [22, 23]. CCL-18 plays an important role in promoting the invasion and metastasis of breast cancer cells. The high level of CCL18...
expression is closely related to the poor prognosis of breast cancer [24, 25]. The results of this study found that the concentration of IL-6 in the observation group was higher and the concentration of IGF-1 and CCL-18 was lower than that in the control group 1 month after surgery, suggesting that psychiatric nursing intervention can effectively improve the serum IGF-1, IL-6 and CCL-18 levels of breast cancer patients.

To sum up, psychiatric nursing can help postoperative recovery of breast cancer patients, improve the body’s immunity, reduce the recurrence rate, and improve psychological state and nursing satisfaction. However, the sample size of this study is small. There is no exploration on mechanism related to that how psychological care can improve the of serum IGF-1, IL-6 and CCL-18 concentration in breast cancer surgery patients. In-depth studies with larger sample size will be carried out in future.

Disclosure of conflict of interest

None.

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References


