

Effects of preoperative psychological intervention on early postoperative cognitive dysfunction after off-pump coronary artery bypass surgery.

Zhan Shi^{1,2}, Jianxiang Song^{1,2}, Huiwen Chang^{1,2}, Yajun Zhang^{1,2*}

¹Department of Cardio-Thoracic Surgery, the Third People's Hospital, Yancheng, PR China

²Department of Cardio-Thoracic Surgery, Yancheng Hospital, Medical School of Southeast University, Yancheng, PR China

Abstract

Background: This study aims to evaluate the effect of preoperative psychological intervention on the prevalence of early Postoperative Cognitive Dysfunction (POCD) in patients undergoing Off-Pump Coronary Artery Bypass Surgery (OPCAB).

Materials and methods: Two groups of 1:1 paired patients (34 cases each) who underwent selective OPCAB were enrolled. One group received targeted preoperative psychological intervention (the intervention group), while the other group did not (the control group). Levels of preoperative anxiety before and after psychological intervention were evaluated using the Self-Rating Anxiety Scale (SAS). Occurrence of POCD on postoperative days 1, 3, 5, 7, and 14 was examined using Mini-Mental State Examination (MMSE). Enumeration and measurement data were compared between groups using χ^2 test and paired t-test, respectively.

Results: The results indicated that there was no significant difference between patients of the intervention and control groups regarding gender, age, baseline SAS score, cardiac function, operation time, anaesthesia time, and intensive care unit length of stay ($p > 0.05$). After psychological intervention, preoperative SAS score of the intervention group became significantly lower than that of the control group (50.91 ± 3.54 vs. 66.76 ± 3.18 , $p < 0.05$), and the prevalence of POCD was significantly lower in the former than in the latter group on postoperative days 3 (4/34 vs. 9/34), 5 (5/34 vs. 11/34), and 7 (5/34 vs. 10/34) ($p < 0.05$).

Conclusion: Preoperative psychological intervention significantly alleviates anxiety and effectively reduces the prevalence of early POCD in patients undergoing OPCAB.

Keywords: Psychological intervention, Cognitive dysfunction, Off-pump coronary artery bypass surgery.

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Introduction

Mental disorder is among common complications after cardiac surgery, manifested clinically as delirium and cognitive dysfunction. Because it can cause prolonged hospital stay, high complication and death rates, and increased medical expenses [1,2], mental disorder is attracting increased attention from cardiac surgeons. Although there are a large number of studies on the etiology of postoperative mental disorders, relevant pathogenic factors and underlying mechanisms are complex and not completely elucidated. We, together with many other researchers, believe that the occurrence of postoperative mental disorders is related to a variety of factors, such as gender, age, race, preoperative cardiac function, personality, mental state, educational level, operation time, extracorporeal circulation, and Intensive Care Unit (ICU) environment and length of stay [3-5]. Positive perioperative preventive measures have long been implemented on factors that are relatively easy to change (e.g., operation time, extracorporeal circulation, and ICU

environment and length of stay), but the outcomes remain unsatisfactory [6]. In this study, whether to receive individualized preoperative psychological intervention was taken as a difference, and two groups of patients with similar general attributes were treated using the same methods of anaesthesia, surgical treatment, and perioperative management. The occurrence of mental disorders within 14 days post-surgery was examined and assessed, in order to evaluate the effect of preoperative psychological intervention on the prevalence of Postoperative Cognitive Dysfunction (POCD).

Materials and Methods

Patients

This study enrolled patients who underwent selective Off-Pump Coronary Artery Bypass surgery (OPCAB) during January 1, 2009 to December 31, 2013 in the Third People's Hospital of Yancheng, Jiangsu Province, China.

Inclusion criteria: 1) junior high school or higher level of education; 2) preoperative Mini-Mental State Examination (MMSE) score ≥ 27 points; and 3) Self-Rating Anxiety Scale (SAS) score >60 points.

Exclusion criteria: 1) previous history of severe metabolic disease, active liver disease, cardiac surgery, and stroke; 2) association with central nervous system disorder and mental disease; 3) administration of sedative and antidepressant; 4) alcoholism and anaesthetic or surgical complication; 5) recent experience of major personal life event; and 6) lack of coordination to complete the scale examination.

Two groups of 1:1 paired patients (34 cases each) were selected by considering demographic factors (same gender, age difference ≤ 2 years), SAS score (difference ≤ 5 points), and cardiac function (same grade) as the indicators. Each group had 20 males and 14 females, aged 62 to 79 years (mean (70.44 ± 4.73) years) in the intervention group and 62 to 78 years (mean (70.24 ± 4.71) years) in the control group.

Treatments

All patients underwent routine preoperative preparation and received general preoperative education by a responsible nurse. Anaesthesia was achieved using the same method and drug for different groups. The surgical procedure was OPCAB. Patients were transferred back to the same ICU for 3-4 days of routine postoperative care and then to general ward for continued treatment.

In addition to the above routine treatments, patients of the intervention group particularly received targeted preoperative psychological intervention by a clinician in charge (the author), as described below:

1) Observing and listening: In a quiet and relaxing environment, patient was accompanied by his or her most trusted family member. At the beginning of the conversation, clinician patiently listened to patient's complaint and demand and carefully observed his or her look and gesture, so as to understand the subject's hope and fear and to achieve the initial trust, laying a foundation for further communication.

2) Repeating and asking: On the basis of careful observation and listening, clinician simply repeated and questioned to verify the issues of greatest concern and worry to patient, in order to grasp the focus of further communication. Meanwhile, clinician cooperated with friendly, confident, and positive eye contact to build a further relationship of trust.

3) Cognitive therapy: In accordance with specific situation of different patients and in review of the issues they concerned, clinician scientifically and vividly analysed and interpreted the case in an understandable way, aiming to eliminate patients' excess anxiety and fear about the disease due to lack of appropriate medical knowledge and false speculation by themselves.

4) Describing process: Clinician briefly described the whole process of diagnosis and treatment and simplified the intraoperative course of surgery in a comfortable voice. Patient

was informed of possible normal discomfort during diagnosis and treatment in advance and taught how to relax and cooperate with medical staff during the treatment, thereby reducing postoperative anxiety and fear due to normal discomfort.

5) Establishing confidence: Clinician flexibly took use of stories from known people or public figures whom had similar diseases and were successfully cured. These set good examples and thereby helped patient establish a fundamental belief for final victory over the disease.

Inspection and evaluation indicators

A clinician blind to patient groups completed MMSE on postoperative days 1, 3, 5, 7, and 14. MMSE scores <27 points were recorded as postoperative mental disorder and the prevalence of POCD at different time points was calculated [7].

Statistical analysis

Data were analysed using SPSS 17.0 (SPSS Inc., Chicago, IL, USA). Frequency, mean, and percentage were used for descriptive statistics. Enumeration and measurement data were compared between groups using χ^2 test and paired t-test ($\alpha=0.05$), respectively.

Results

Comparison of clinical features and perioperative situation between groups

There was no significant difference between patients of the intervention and control groups regarding gender, age, baseline SAS score, cardiac function, operation time, anaesthesia time, and ICU length of stay ($P>0.05$). However, after psychological intervention, preoperative SAS score of the intervention group became significantly lower than that of the control group ($p<0.05$) (Table 1).

Comparison of the prevalence of POCD at different time points between groups

After psychological intervention, the prevalence of POCD in patients of the intervention group decreased at various time points compared to that of the control group. In particular, the prevalence of POCD was significantly lower in the former than in the latter group on postoperative days 3 (4/34 vs. 9/34), 5 (5/34 vs. 11/34), and 7 (5/34 vs. 10/34) ($P<0.05$; Table 2).

Table 1. Comparison of clinical features and perioperative situation of patients between the intervention and control groups before off-pump coronary artery bypass surgery (mean \pm standard deviation).

Group	Intervention (n=34)	Control (n=34)	χ^2 or t	p
Gender				
Male	20	14	1	0

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Female	20	14		
Age (year)	70.44 ± 4.73	70.24 ± 4.71	1.559	0.128
Baseline SAS score	65.80 ± 2.89	65.65 ± 2.91	0.331	0.743
Cardiac function				
Grade II	19	19	1	0
Grade III	15	15		
Operation time (min)	140.28 ± 19.12	143.18 ± 19.90	-1.529	0.136
Anaesthesia time (min)	167.85 ± 19.62	166.00 ± 18.04	1.126	0.268
ICU stay (hour)	75.06 ± 11.19	77.74 ± 10.80	-1.346	0.188
Preoperative score	SAS 50.91 ± 3.54	66.76 ± 3.18	-36.27	0

Table 2. Comparison of prevalence of early postoperative cognitive dysfunction between the intervention and control groups at different time points after off-pump coronary artery bypass surgery.

Observation time (day)	Intervention (n/%)	Control (n/%)	χ^2	p
1	2 (5.9)	5 (14.7)	1.433	0.214
3	3 (8.8)	10 (29.4)	4.66	0.031
5	5 (14.7)	12 (35.3)	3.843	0.046
7	5 (14.7)	10 (29.4)	4.191	0.039
14	0 (0)	1 (2.9)	1.015	1

Discussion

Early POCD is one of the most common complications after coronary artery bypass grafting. It has long been problematic to the majority of clinicians because of high incidence, complex etiology and pathogenesis, and difficult prevention and treatment. According to the biomedical model, early studies inferred that factors such as perioperative hypotension, hypoxemia, cerebral vasoconstriction, extracorporeal circulation, air or small emboli and embolisms, and effects of certain anaesthetic drugs are possibly the major causes of postoperative mental disorders [8]. Substantial research and improvement were thereby made towards these factors. However, as levels of perioperative anaesthesia and care were elevated, microthrombus filter was improved, and off-pump surgical techniques became matured, there have been significant decreases in complications of circulatory and respiratory systems but no obviously decreasing trend in the incidence of POCD after cardiac surgery [9,10].

More recently, since the bio-psychosocial model was proposed, there has been a growing awareness that psycho-social factors significantly affect the prognosis of many diseases, especially cardiac diseases. Thus, Professor Dayi, a Chinese scholar, constructed a dual-heart medical model. Owing to effective integration of cardiology and psychiatry, significant progress has been made in diagnosis and treatment of cardiac diseases using this model. It coincides with the concept of integrative

medicine advocated nowadays [11]. Nevertheless, strong evidence remains lacking for the exact role of psycho-social factors among various causative factors of early postoperative mental disorders after OPCAB.

In the present study, two groups of patients with similar biological factors were chosen as the subjects. Patients received different treatments of preoperative psychological intervention before examination using the same evaluation indicators. The prevalence of early POCD at different time points after OPCAB was compared between groups. Results showed that appropriate individualized preoperative psychological intervention effectively reduced the prevalence of early POCD but did not completely avoid its occurrence after OPCAB.

The results presented in this study indicate that: Firstly, early POCD in patients undergoing OPCAB is a disease caused by multiple factors, of which psycho-social factors are an important independent risk factor. Effective preoperative intervention can achieve satisfactory results for prevention and treatment of early POCD. Secondly, for the prevention and treatment of multifactorial diseases, integrated measures are commonly implemented by focusing on various causes in order to achieve good results. A careful analysis of these causes of disease showed that it is difficult for a number of biological factors (e.g., age, gender, and severity of disease) to change, while psycho-social factors (i.e., psychological and mental states) can change relatively easily [12]. The key is to promote better integration of cardiology and psychiatry, constantly improve the level of psychological intervention, and train numerous cardiologists who can properly apply psychiatric knowledge and skills.

Though we have received some of the interesting result, his study also has two limitations. Firstly, standard model for psychological intervention is lacking, thus may affect the reliability of the results to a certain degree; and Secondly, this study only selected patients undergoing selective OPCAB in our hospital, and the universality of the results needs to be further demonstrated in research with a wider range of samples.

Acknowledgements

None.

Conflict of Interests

None.

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*Correspondence to

Yajun Zhang

Department of Cardio-Thoracic Surgery

Yancheng Hospital

Medical School of Southeast University

PR China