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A 5-YEAR PSYCHO-MEDICAL FOLLOW-UP STUDY OF CORONARY BY-PASS ARTERY GRAFT PATIENTS

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ABSTRACT. This is a 5-year follow-up study of coronary artery by-pass graft (CABG) patients. Our aim was: To study the development of previously rated psycho-medical aspects, with special reference to depression among the CABG patients. The patients were sent two questionnaires, one of which focused on psycho-medical factors and the other on depression. The average rate of participation was 80%. The most important results were that previously high levels of depression were no longer to be found and that post-operative depression among the CABG patients clearly disappears over time.

Key words: coronary artery by-pass graft, CABG, BDI, MMPI, follow-up, depression.

INTRODUCTION

Coronary artery by-pass graft (CABG) operations have become quite common in Iceland, a nation with a population of 260,000. This type of operation was first performed in 1986. Since then over 1,000 operations have been conducted. The present study focuses on the psycho-medical aspects of patients who were operated on during the initial 12 months of the programme, 5 years ago. The psycho-medical condition of these same subjects at a 1-year post-operative interval has been reported on previously (12).

In this previous study the subjects repeatedly answered the same short questionnaire before operation and before discharge, and at 3 and 12 months after operation. In addition, the subjects answered the Minnesota Multiphasic Personality Inventory only once, at the 3-month post-op. period. Among the significant findings was that clinical depression was to be found by the use of the MMPI (D-scale ≥ 70) among the majority of a sample of CABG patients tested 3 months after the operation (12). Depression is often noted among subjects with other chronic somatic states (6, 13).

In the present study these subjects were contacted again 5 years after the operation and evaluated primarily with regard to their depression, but also to other factors. As little was known about the current status of depression among the CABG patients it was of considerable interest to find out whether the depression had persisted or remitted over time. Mixed findings exist on the issue of whether depression is present pre-operatively among heart patients waiting for a CABG operation, and if so, when it subsides (11, 14, 5).

The aim was to study the development of previously rated psycho-medical aspects, with special reference to the existence of depression among the CABG.

MATERIALS AND METHODS

Subjects

The subjects in the study came from the departments of cardiac surgery and general surgery. Both departments undertook separate 5-year follow-up studies on the progress of their patients. Identical questionnaire material was used. The subjects in the study consisted of two groups: One group of former CABG patients, and the other a comparison group of patients that had undergone a gall bladder (GB) operation during the same time period. However, due to an abnormally high number of deaths in the GB group since the original operation, the reasons of which could possibly effect questionnaire responses of the remainder, we decided to exclude the GB group from the present analysis.

The CABG group consisted of those who had undergone CABG in Iceland during the initial year of these operations 5 years ago and were willing and able to participate in this study. The number of CABG participants in this study was 51[1], which is 86% of those initially operated on and still alive.

The mean age of the participants in the CABG group was 66.5 (Table I).

[1] One set of answered questionnaires from a non-responder was received 10 months after the other participants had sent in theirs. This set of answers which did not deviate from the others was not used in the results in this paper.

Table I. *Participants by age and gender*

	CABG
Initial number of subjects	62
Deceased 5 years post-operatively	2*
Remaining number of subjects	59
Non-participants:	
—demented or not interested in participating	3
—nonresponders to survey	6
Total number of participants in survey	51
Mean age and SD of participants	66.5 ± 7.5
Percentage of men	90.4
Percentage of women	9.6

Method

The MMPI was used as the main diagnostic instrument in the previous study (12). As the subjects now, 5 years later, were hard to contact and widely distributed throughout the country, we decided to find another instrument that was easier to administer than the MMPI and which would correlate with the results of the MMPI (D-scale). For this reason the Beck Depression Inventory[2] (BDI) (3) was chosen. The inventory is both widely known and fitted the study quite well. The correlation coefficient of the BDI with the MMPI has proved to be satisfactory or 0.60 (2, 18). Although the D-scale on the MMPI is often thought of as a trait marker of depression, more than half of the items comprising the scale are on the depressive state or affect (7). In clinical work, the scores on the scale have been found to vary considerably depending on the individual's mood when the test was taken (9). In this way the D-scale and the BDI do, in effect, measure largely similar states.

All the subjects received by mail the BDI as well as a 9-item questionnaire which was especially compiled for this study. The questionnaire not only included the same questions asked at the previous follow-up period (12) but also additional new ones. Symptom assessment was made by subjective ratings of the severity of each condition in question (stress, anxiety, health, healing, pain). The subjects marked most of their answers on to graphic rating scales that were a modification of Visual Analogue Scales (16). Each scale consisted of a 10-cm line with the marker at the extreme left denoting absence of symptoms and words describing increased severity as one moves to the right end of the line. In addition, there were questions on employment, pain and medication. The subjects were instructed to send the answered questionnaires back as quickly as possible in a prepaid envelope included.

A two-tailed chi-square test with 1 degree of freedom was used for statistical analysis (8), with a significance level of 0.05 or higher.

RESULTS

Beck depression inventory

The results from the BDI (Table II) did not show any significant difference in scores between the CABG and population comparison group (15). The distribution of scores among the categories was similar.

3-month post-operative MMPI vs 5-year post-operative BDI results: The CABG group was divided into two parts (Table III). The division was based on previous MMPI scores of depression which were obtained 3 months after the operation. Comparing the scores from the BDI for subjects in these two groups, no statistically significant differences were found (Fig. 1).

Questionnaire

1 year vs 5 year post-operative results: Compared with the 1-year post-op. results, both trends and statistical differences were noted.

Stress (Fig. 1) had decreased by 18% after 5 years ($p < 0.01$), and there was a similar reduction in "anxiety", which had decreased by 22% between the periods ($p < 0.01$). The proportion of those that had "completely healed" was similar between the periods, on average about 45%. The proportion of those who claimed to be "pain free" had decreased from 75% to the present 61% (p = ns).

Only 12% of those employed before the operation had not returned to work 5 years later. As to the problem of experiencing a "shortness of breath", 64% in the CABG claimed so. Few CABG subjects complained of "chest pain at rest" (<5%) but slightly more of pain while walking on "even ground" (19%). The CABG group showed a number of individuals (33%) indicating that they had chest pain while walking "up a slant". The number of subjects who

Table II. *Results from the Beck Depression Inventory*

	CABG[1]		Population group[2]		p
Score:					
Normal range (0–9)	38	78%	239	80%	ns
Mild depression (10–15)	9	18%	32	11%	ns
Mild-moderate depression (16–19)	2	4%	27[3]	9%	ns
Moderate-severe depression (20–29)	0	—			
Severe depression (30–63)	0	—			

[1] Two CABG participants did not answer the inventory.
[2] General population group ($n = 298$) from Oliver & Simmons (15).
[3] Total of number of individuals scoring from 16–63.

[2] Original 21-item version.

Table III. *A comparison of current Beck Depression Inventory results of CABG subjects who were tested and were either diagnosed as depressed (MMPI) or nondepressed 5 years ago*

Beck Depression Inventory results	Previously depressed on the MMPI ($n = 15^{*}$)		Previously nondepressed on the MMPI ($n = 14^{**}$)		p
Score:					
– Normal range (0–9)	11	73.3%	11	81.8 %	ns
– Mild depression (10–15)	3	20.0%	2	15.1 %	ns
– Mild-moderate depression (16–19)	1	6.7%	1	3.1 %	ns
– Moderate-severe depression (20–29)	—	—	—	—	—
– Severe depression (30–63)	—	—	—	—	—

* Of the original 18 depressed: 1 has died, 1 did not respond, 1 did not answer the BDI.
** Of the original 15 non-depressed: 1 did not respond.

did not receive any medication at the time of the study was 8% among the CABG.

The number of subjects who did not receive any medication at the time of the study was 8% among the CABG.

DISCUSSION

In this study we noticed a clear reduction in depression among the CABG group. No significant differences were found on the BDI scores of depression among the CABG who had previously received a score indicating depression on the MMPI (Table III), and those who had not. And as has been noted by Carney et al. (5), symptoms of depression tend to recede with time. This fact is in line with our own findings which have shown a sharp decrease in depression over the 5 years since the operation in comparison with the present normal population level. This took place without the attrition rate of the depressed group being the only explanatory factor. The attrition proportion due to nonparticipation or nonresponse of the originally depressed subjects was 17% from the 3-month post-operative period to the present time, while it was 7% among the nondepressed.

It thus seems clear that depression recedes to a normal level in time, following the operation. The time interval between the two periods when depression

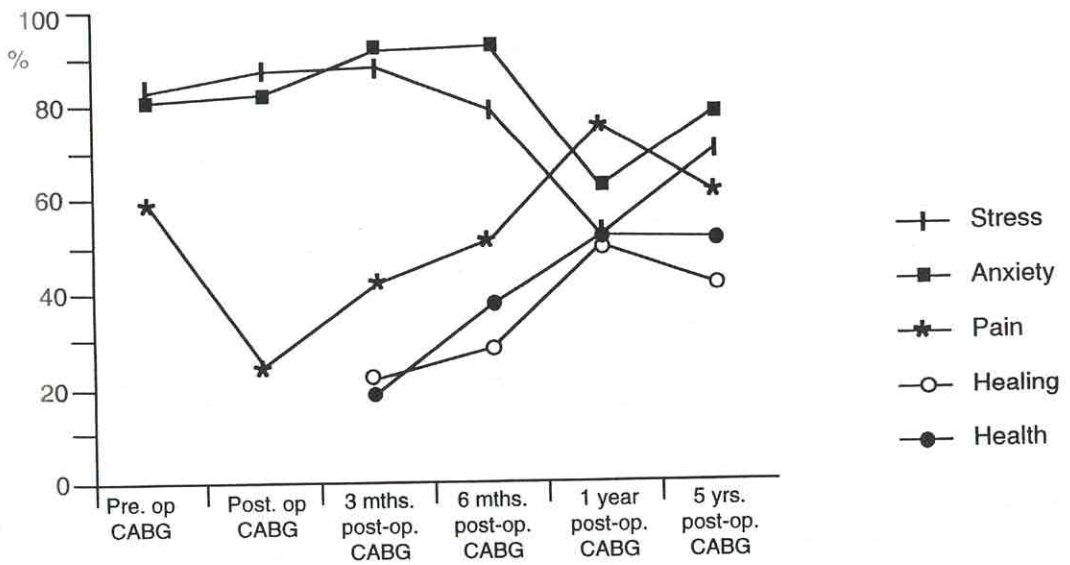

Fig. 1. Psycho-Medical Self-Report Estimates. The following conditions are portrayed: Stress; anxiety; pain; healing and health. Shown are the total percentages of subjects who at each test period have rated their conditions to be in the least severe condition, i.e. ranging from 0–2.5 cm on a 10 cm graphic rating scale, where 0 denotes the least severe condition.

was estimated was 4.7 years. We know that the average length of time spent on sick-leave among the CABG because of the operation was 6.6 months (12). We might be allowed to assume that depressive periods might have continued up until the time when they returned to work and possibly during the few initial months of employment. Setbacks in employment and in their private lives might also have elicited new periods of depression.

Aside from the depression, a gradual improvement has taken place among the CABG in relation to psycho-medical factors since the operation (Fig. 1 and Table IV).

It is interesting to see that there is a marked decrease in anxiety and stress at the 1-year interval among the CABG (Fig. 1), a decrease that has levelled back for the most part at the time of the 5-year survey. A possible explanation could be the anxiety and stress that the returning to work must generate, both with reference to whether they feel up to performing their former tasks as well as to discerning which tasks they are able to perform without feeling pain. On average subjects returned to work 6.6 months after the operation (12). This period of returning to work falls between the 6- and 12-month survey intervals.

Comparisons of scores of different measuring instruments is difficult to carry out. In the present case we compared a 566-item psychological test with a 21-item inventory. When comparing the results from the BDI with the MMPI scores of depression a few considerations should be borne in mind: *i*), a satisfactory correlation between BDI and MMPI results of cardiac patients ($n = 241$) has been found $r = 0.56$ (4); *ii*), Gottlieb & Cane (10) recommend that a cut-off point of a score of 20 (instead of the recommended ≥ 10) or more be used when affixing the label of "depressed" to any BDI score; and *iii*) Oliver & Simmons (15) found in a comparison of BDI scores to scores from the Diagnostic Interview Schedule, which is a DSM-III* (1) based structured interview, that the BDI overestimated by 2.5 times the frequency of depression compared with the DIS. Oliver & Simmons' study is one of the few BDI studies that has been conducted on subjects from the general public.

By following the recommendations suggested by Gottlieb & Cane (10) and applying them to our BDI results (Table II) we find no CABG subjects depressed at the 5-year follow-up date. However, if we follow Oliver & Simmons (15) recommendations, we find only a few CABG individuals mildly depressed.

In an Icelandic population study where the number of depressed subjects in the general population were estimated, 1.9% were found to have a 1-month point-prevalence of depression (19). Based on the above-mentioned recommendations and the comparison of our data to general population figures (19) we find the CABG to be mildly depressed in a minority of cases. The result in no way detracts from our conclusions.

In the light of our previous findings of 3-month post-operative depression (1), we know that depression is common following the CABG operation. But the question remains whether the depression originates before the operation, or whether it is a mixture of both pre- and post-operative conditions.

In a study of 52 patients Carney et al. (5) found that depression at the time of cardiac catheterization was the best prognostic factor in predicting the need for a CABG operation in the forthcoming 12 months. Another example of pre-operative depression was found by Underwood et al. (20), where an association between depression and anxiety and the time spent on a waiting list for a CABG operation was found. Both these studies showed evidence of pre-operative depression. The condition may well carry on into the post-operative stage. Although we do not know about the role of depression in our sample before the CABG operation, these findings do seem to show that depression may indeed precede the undergoing of surgery.

The present study, however, gives few leads as to the exact rate of reduction of depression in the time interval between the immediate post-operative period and the 5-year follow-up date. This question will have to await another study.

*The diagnostic criteria of the American Psychiatric Association, The Diagnostic and Statistical Manual of Mental Disorders (3rd edn).

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