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Defense Mechanisms in Patients with Bone Marrow Transplantation: A Retrospective Study

1.Theoretical considerations and guiding questions

The impact of defense processes on coping with threatening life diseases has been shown in many studies especially with regard to cancer, chronical hemodialysis and after myocardial infarction (Gaus and Köhle 1986). However, systematic studies on patients after bone marrow transplantation (bmt) rarely focus on defense mechanisms influencing the adaptation process.

Brown and Kelly (1976) describe psychological problems in 6 adolescent and 6 adult bmt-patients during 8 phases of the treatment. Being confronted with the anxiety inducing decision to bmt they reacted with denial and displacement. Patenaude and Rappeport (1982) report on several defense mechanisms occurring in 4 patients after bmt, such as minimalization, withdrawal and denial after death of the patient "in the other bed". These retrospective studies with small groups of patients discover defense mechanisms as side-effects.

The patients of our study being confronted with the diagnosis of an hematological disease such as leukemia and an aggressive medical treatment (detailed description of the bmt-treatment at University Hospital Ulm see Arnold et al. 1986, 1989) like bmt have to cope with the following unspecific stress situations comparable to other cancer diseases: sudden confrontation with a life threatening diagnosis; short time period between first symptoms, diagnosis and treatment; overstraining side-effects due to the medical treatment (pain, loss of hair, infections); invasive diagnostic and therapeutic operations; uncertainty concerning the success of the therapy; necessity of an adaptive organization of the patient's daily life. In addition the patients are confronted with bmt-specific stress situations (Beutel 1988): germ-free isolation in the tent; physical inactivity; waiting period for the taking of the new bone marrow during several weeks. Finely the graft-versus-host-disease puts at risk the success. The bmt is the patient's only hope for curing. Because of the advancing development in bmt the treatment conditions had been changing during the period (1978--1986) we retrospectively investigated.

The aim of our study is to explore which defense mechanisms are occurring and whether the defense organization is changing during the different phases of the treatment.

Our theoretical understanding of defense processes is characterized by a detachment of drive-related foundations of the psychoanalytic concept; we conceptualize defense as a major tool of the regulation of self- and object - relation (Steffens and Kächele 1988). By means of defense the ego masters internal conflicts aroused by the external trauma. The stress caused by disease and therapy may well reactivate passed unconscious conflicts as well as stir up new dangerous and painful affects which by themselves initiate defense manoeuvres. The ego has to balance between the intrapsychic object-related needs, wishes and the external demands of the disease and its treatment consequences. The defense mechanisms lead to a distorted perception of reality and to the exclusion of conflicting self-aspects. This influences cognitions, emotions, actions and social relations of the patient possibly resulting in a less optimal adaptation in the therapeutic situation or even weakening the tolerance for unbearable situations. On the other side the defense operations may conserve the functioning of the ego in a situation of overwhelming anxiety and impending fragmentation of the self.

As the material of the study consisted of retrospective interviews it is evident that a host of factors are operating that counteract the ecological validity of this pilot study. What we in fact are investigating are defense mechanisms as they are operating when patients retrospectively describe their experience. However, this approach seems suitable to gain first experiences in a new field of research. The results may support the generation of hypothesis and the development of appropriate methods for assessment of defense mechanisms in a prospective study[1].

2. Methods

With the exception of those measuring denial methods for assessment of defense mechanisms are only scarcely available (Beutel 1985). Since defense mechanisms are conceptualized as an unconscious process, ratings by expert observers may be more congruent with the logic of the object than procedures for self-rating. The verbatim transcripts of 34 retrospective semistructured interviews with patients after bmt give the basic information for the two raters in

this investigation. The interviewer and the two raters are not identical. Our approach entails that defense mechanisms are not only a stable part of personality development, which to a certain extent may be the case, but also show a certain amount of reactivity to situational factors. Therefore we differentiated 3 phases in the patients' descriptions:

Phase a:	acute confrontation of the patient with the diagnosis, the vital threat by the disease itself and the suggested treatment.
Phase b:	ongoing crisis with extreme somatic and psychic stress during the procedure of bmt (radiation, chemotherapy, isolation in Life Island beds, transplantation).
Phase c:	stabilization and consolidation after discharge from inpatient treatment with diminishing danger of somatic complications, adaptation to changes in somatic, cognitive-emotional and social aspects.

In order to achieve at least what Luborsky (1984) calls a guided clinical rating we decided to work with a defense mechanism inventory called Clinical Judgment of Defense Mechanisms (CJDM, German: KBAM, Ehlers and Czogalik 1984). We shall report on results with a slightly modified version of the CJDM adapted to the specific situation of our patients. The CJDM originally contains 26 categories that can be rated on a five point intensity scale. The rating is directed toward the probability of the presence of a given defense mechanism. The categories cover the classical defense mechanisms as described by A. Freud (1936), in addition some of M. Klein's early defense formations (1948) as well as some symptoms that are thought of as products of defense activity. The Ulm version of the CJDM contains 21 categories excluding some defenses that were unlikely to turn up in our material.

The symptom formations were dropped. Some of the categories of the CJDM were condensed into one (e.g. reaction formation and turning into the opposite). However, we added the category "sublimation" to cover creative solutions of perceived dangerous situations and the category "symbiotic alliance" as an interpersonal defense mechanism (Mentzos 1976) occurring in face of severe threat. Most of the other categories have only slightly been revised, however, we have given up the drive-related aspects describing the transformation of wishes, ideas, affects and imagined or real dangers (S. Freud 1926, A. Freud 1936, Bibring et al 1961, Ehlers 1983, Laplanche and Pontalis 1986).

The identification of the defense mechanisms is hardly possible without some detailed knowledge of a patient's general make-up; therefore the phase of identifying relevant text-passages served also the useful purpose to render us familiar with the particularities of each of the patients. The following examples give an impression of the text material:

Example 1: avoidance

"... I don't know if anybody supported me, but I believe that this is my fault, I rejected everybody not intentionally, but I said I didn't want to see anybody, or I didn't like that, but I didn't want to talk to anybody..."

Example 2: regression
"...it was impossible at home and it was so extreme, that I didn't do anything without help, neither getting up or washing myself or taking my medicine, I was totally dependent..."

Example 3: reaction formation/turning into the opposite
"...and then I've found it very exciting that I'm here, and also, the operation for the Hickman-catheter just recently, suddenly the thought occurred to me, my school mates they've got to work hard and I'm lying here leisurely..."

Example 4: projection
"...it really was a hard blow for my mother, the illness, I think she's grown older, it seems to me..."

3. Results

The clinical-hematological characteristics of the sample are presented in table 1.

Table 1
Clinical-hematological characteristics of 34 patients:

Age:	17-50	x=23	(at time of bmt)
Sex:	16 women 18 men		
diagnosis:	21 acute lymphatic and myeloic leukemia 7 chronic myeloic leukemia 3 severe aplastic anemia 3 myelodysplastic syndrome		
Time lag between bmt and interviews:	7-96 months		

The estimation of reliability of highly inferential codings as it is the case with defense mechanisms has to allow some ambiguity. However, it is important to know about the details of how both raters worked.

Since rater x did not use the score 2 and rater y only scarcely, the matrix can be simplified into yes or no decisions, where scores of 1 or 2 indicate no, scores of 3 to 4 indicate yes decisions (table 2).

Table 2
yes or no interrater reliability

	y1,2(no)	y3,4,5(yes)	total
x1,2(no)	1318	387	1705
x3,4,5(yes)	156	323	479
total	1474	710	2184

As it turns out, the interrater reliability of the defense rating is not overwhelming (Kappa .42, $p<0.001$). Although there is significant agreement, still it indicates considerable differences between the judgments. The differences are mainly caused by the fact that rater y favors the occurrence of defense mechanisms whereas rater x does not see one.

The next step consisted of calculating the mean intensity of defense mechanisms in the sample (table 3). These intensity measures are mean values which were averaged over all patients and phases.

Table 3
mean intensity of defense mechanisms

defense mechanism	mean intensity
1. denial	3,45
2. avoidance	2,57
3. minimalization	2,55
4. repression	2,42
5. isolation	2,39
6. reaction formation	2,26
7. rationalization	2,18
8. displacement	2,14
9. projection	2,02
10. regression	1,92
11. resignation	1,76
12. identification	1,66
13. undoing	1,52
14. idealization	1,50
15. sublimation	1,47
16. symbiotic alliance	1,41
17. omnipotence fantasies	1,39
18. somatization	1,36
19. turning against self	1,27
20. devaluation	1,20
21. splitting	1,12

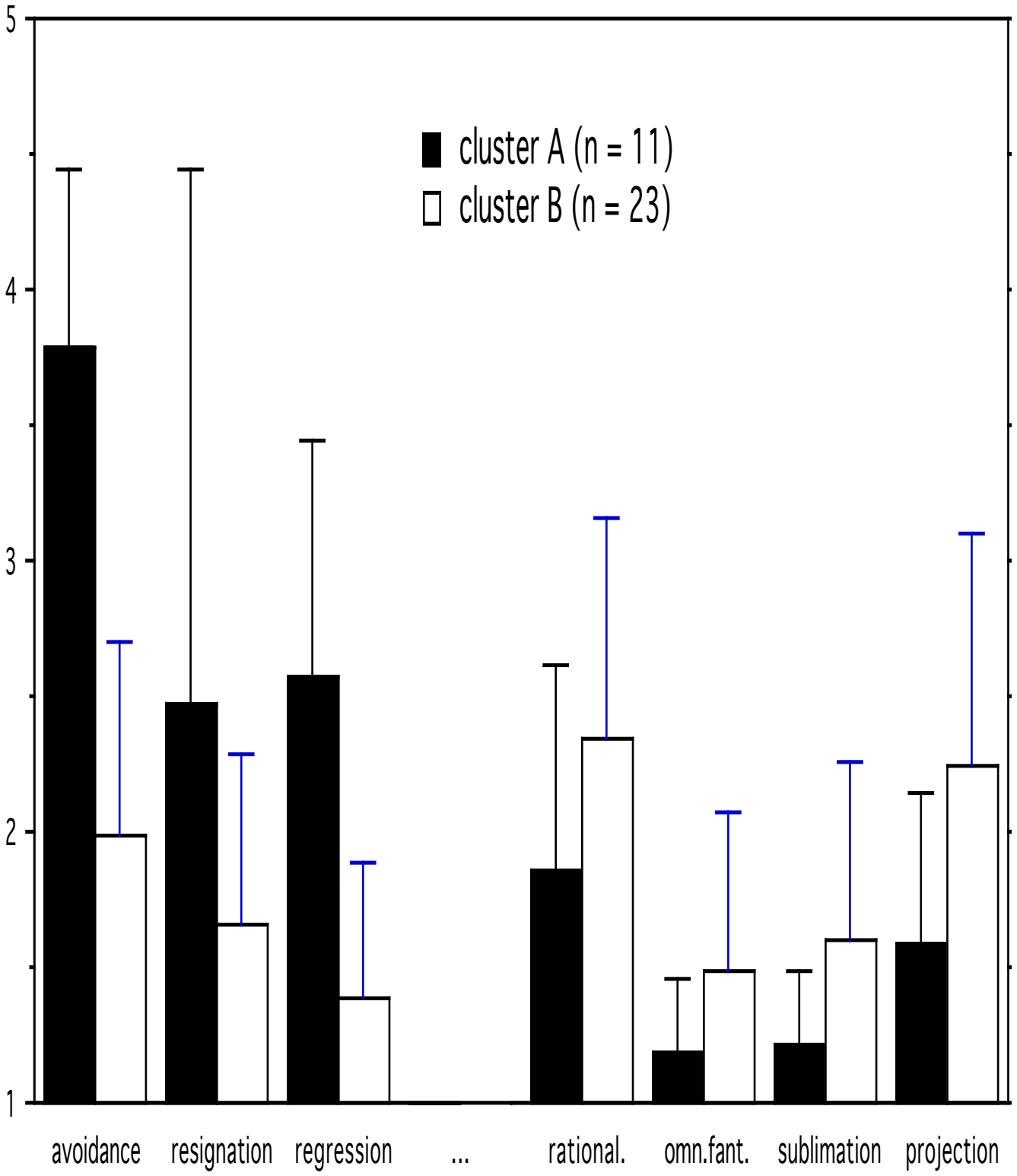
Cluster analysis of the defense mechanisms reveals some interesting interconnections of defenses, which on the level of simple correlation (similarity measure) match clinical presuppostions. In table 4 the first pair of defense mechanisms is correlated to higher degree than the second, the second than the third and so on.

Table 4
correlating defense mechanisms

1. idealization	omnipotence fantasies
2. regression	resignation
3. resignation	avoidance
4. somatization	devaluation
5. reaction formation	minimalization

In a next step we tried to find subgroups of patients having same or similar configurations of defense mechanisms. For this purpose a non-hierarchical cluster analysis of cases was applied[1]. A two cluster solution was suitable for a clinically meaningful interpretation (figure 1):

[1]Die statistische Beratzng erfolgte durch Dr. Porkony



Defense mechanisms typical for the cluster A and cluster B respectively. Means

Figure 1 Defense Mechanisms by Patients in Cluster A a

Cluster A consisting of 11 patients. Their "typical" constellation of defenses includes avoidance, resignation and regression. "Typical" means that these defense mechanisms are in this patient group significantly higher than in the other group.
Cluster B consisting of 23 patients. Their typical constellation of defenses includes projection, sublimation and omnipotence fantasies.

By applying discriminant analysis between the two clusters we intended to find some "extremely typical" patients representing their cluster and being as far removed as possible from the other cluster. We were looking for extreme cases, so called "super A" and "super B" patients. By this way we wanted to recombine our statistical results with the clinical experience. Gradual discriminant analysis confirmed that with help of defense mechanism values it is possible to discriminate patients between cluster A and cluster B. The discriminant function used for this classification is positive for the cluster A and negative for the cluster B. 4 patients with the highest positive value we classified as "super A" and 3 patients with extreme negative value as "super B"
By factor analysis of the defense mechanisms we find the first three factors explaining 37 % of the complete variance. Factor one subsumes cluster A and cluster B completely and explains 15% of the complete variance. Therefore we got small groups of defense mechanisms contributing to more various factors. Factor two subsumes a group of denying defense mechanisms (displacement, repression, denial). Complete interpretation of factor analysis results would be rather complicated. So we confined ourselves to the interpretation of the first unrotated factor.

Relating the analysis of defense mechanisms to the three phases of the treatment we found no systematical differences.

4. Case reports

As an illustration of the significant difference between cluster A and cluster B we want to describe the course the illness and the rehabilitation took in 2 typical patients.

Mrs. A ("super A")
The main defense mechanisms in this case are denial and projection in phase a, avoidance, resignation and repression in phase b and c.

When Mrs. A was 27 years old an acute myeloic leukemia was diagnosed. 9 months later the bmt was done. Being a single without children she lived together with a girl friend. After bmt she started to work in the same factory as before but changing from the assembly line to the quality control. After visiting different hospitals she was told the diagnosis. Obviously shocked by the diagnosis she remembered her aunt dying of leukemia. But she emphasized her family being shocked at the diagnosis. In the tent phase she became depressive and withdrew into herself. She was afraid of losing her sister, the bone marrow donor, by an accident before the bmt. After discharge her physical condition was good. She was able to do sports. 9 months after bmt she did a full time job. She retired from social contacts with the peer group more than before; whereas the relationship to the family members became closer. She was no longer interested in men because of her medical treatment causing sterility. Future perspectives seemed restricted by her tendencies to resign and to avoid contacts.

Mr. B ("super B")

The main defense mechanisms in this case are denial in phase a, isolation, rationalization and omnipotence fantasies in phase b and c.

Mr. B was 22 years old when an acute lymphatic leukemia was diagnosed. One year later after a second recidive he was transplanted. The donor was his twin brother. The retrospective interview took place 24 months after bmt. He lived still with his parents and was quite satisfied with his job. Being told the diagnosis he first refused to realize it. The bmt was the great chance that had to work. In the interview he explicitly described the physical stress in the tent phase. In times of impending crisis and resignation he became angry. The relationship with his symbiotic allied twin brother helped him to enter into struggles with the treating physicians. In the tent phase he refused the medicine criticizing the "high" dose. After discharge somatic rehabilitation was excellent. Doing physical exercises he felt no physical impediments. After 9 months he went back to work. The relationship with his girl friend he had discontinued at the beginning of the disease, as he felt she did not appreciate how serious things were. He did not get involved in a close relationship but was increasing his social activities. His psychic status seemed to him much better after the bmt experience than before. He felt more able to enjoy life, depressive thoughts could be mastered by training. He solved the problems connected with his sterility by an imagined identification with his twin brother who would procreate the children for him.

5. Discussion

In agreement with other studies concerning defense mechanisms in severe diseases (Gaus and Köhle 1984, Beutel 1988) denial was most prominent. If denial favors or inhibits successful coping with diseases and rehabilitation is subject to controversial opinions. According to Vaillant (1971) denial in psychological disturbances is seen as an immature defense mechanism. In situations of immense external danger which can be rarely minimized by a specific behavior, denial seems to increase the individual capacity to act. We agree with Battegay (1989) who points out, if defense allows an active life, a severe disease has a better prognosis. If denial persists as the strongest and most important defense mechanism in the rehabilitation phase, the adaptation process may be inhibited (A. Freud 1936) by the distorted perception of reality.

The cluster analysis generated clinically interesting groups. Elsewhere we presented the results of our investigation on the emotional vocabulary in this text material supporting the validity of our findings.

The "Affective Dictionary" developed and presented by Hölzer (1989) according to the theory of emotions of Dahl (1978) subsumes and classifies the emotional vocabulary into the following categories: positive object emotions (love, attraction), positive self emotions (contentment, joy), negative object emotions (anger, fear), negative self emotions (depression, anxiety). The correlation between the intensity of defense mechanisms and the frequency of affective labels yielded some interesting results. There was a negative correlation between overall intensity of defense and affective labeling (-0.34). Closer inspection of the correlation matrix shows avoidance and resignation correlating strongly negatively, omnipotence positively. Although for most mechanisms not significantly, the intensity of 15 defense mechanisms (out of 21) is negatively correlated with negative self emotions, the exceptions in somatization and turning against self were to be expected. These negative correlations may highlight the primary function of defense: to secure positive feelings for the individual. Hence the predominance of positive correlations between intensity of defense and positive emotions is understandable. The highly positive correlation between omnipotence and positive self feelings seems to be particularly noticeable. The highly negative correlation between "avoidance " and the emotional vocabulary of the category "anger" (-0.79) and between "avoidance" and the Verbal Activity (-0.65) reflect the clinical impression that these patients not only avoid conflictual content but also the talking of itself.

These results help us to generate some hypothesis. The main defense mechanisms in cluster A (avoidance, resignation, regression) may lead to a withdrawal from vital interests. The sequels seem to be minimized self-esteem, less satisfaction and less activity concerning the patient's life and life perspective. The main defense mechanisms in cluster B (projection, sublimation, omnipotence fantasies) may lead to self-esteem and satisfying activity in life. Whether they improve the rehabilitation results and the disease prognosis we can only speculate. Temporarily this group seems to experience a higher quality of life. In this context the reference to the results of coping strategies in the only prospective study concerning distress of bmt-patients during transplantation phase (Neuser 1989) is interesting. By means of patient-self-rating active problem-oriented coping (fighting against the disease, believing in the treating physicians, intending to live more intensively) was regarded as the most helpful behavior.

Due to the retrospective character of the interviews we did not find specific defense patterns related to the 3 phases of the disease. Further investigation has to be done within our prospective study. To improve the interrater reliability we decided to intensify the training of the raters cataloging typical text examples and specifying situation-related definitions. The prospective investigation should answer some important questions: What is successful defense and how does it interact with a successful coping and adaptation process? Do defensive manoeuvres depend on situational factors? Do they change during the different

phases of treatment and rehabilitation? Does defensive organization influence prognosis of the psychic and social rehabilitation process after bmt?

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