

# Psychiatric and surgical outcome in Egyptian donors after living-donor liver transplantation

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## Introduction

Living-donor liver transplantation has emerged as a life-saving alternative for those with end-stage liver disease. However, surgical complications may lead to physical, mental, and psychosocial complications that could affect the quality of life and psychological outcomes of living donors after transplantation.

## Aim

The aim of the study was to assess the satisfaction of donors with the decision to donate and their willingness to donate again and its relation with postoperative complications, and consequently the effect on psychiatric morbidity and quality of life of the donors.

## Patients and methods

The present study evaluated 33 donor candidates who were introduced to donation after being subjected to all medical and psychological tests, which were free of cost. All participants were interviewed using a questionnaire on personal history, relationship to recipient, and satisfaction with donation, a General Health Questionnaire, the SCID-I, Beck Depression Inventory, the Taylor Manifest Anxiety Scale, the PCASEE Quality of Life Questionnaire, and the Clavien classification for surgical complications.

## Results

Among donors 33% reported that they would donate again. One week after surgery, 6% had grade 2 and 6% had grade 3a complications; 3 months postoperatively, 3% had grade 2 and 3% had grade 3a complications. Psychiatric morbidity was 15% (6% anxiety disorders, 6% major depression, and 3% adjustment disorder). No relation was found between quality of life and postoperative complications, whereas depression and anxiety were highly correlated.

## Conclusion

Surgeons and psychiatrists have to work together to select donors, provide assistance in decision making, and minimize any postoperative complications either surgically or psychiatrically.

## Keywords:

living-donor liver transplantation, psychiatric morbidity, surgical complications

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## Introduction

Because of the imbalance between organ shortage and mounting demand, living-donor liver transplantation (LDLT) has emerged as a life-saving alternative for those with end-stage liver disease and has been accepted in many countries worldwide [1].

By definition, a donor is a healthy person without relevant medical or psychiatric problems. Therefore, assessment of the psychosocial outcome using questionnaires comparing a donor with the general population can be difficult to interpret as donors who go through the selection process usually have higher baseline scores than the general population [2]. 'First do no harm', a fundamental medical precept of Hippocrates, is an important philosophy of medicine. LDLT challenges this tenet, because a healthy individual

undergoes a major operation for no physical benefit to himself or herself [3].

Fujita *et al.* [4] established a five-stage decision-making model to help professionals understand the donor's feelings and offer sufficient support. The five stages were (i) recognition, (ii) digestion, (iii) decision-making, (iv) reinforcement, and (v) resolution. The second and third stages described a donor's experience with 'reaching a decision', and the fourth and fifth stages described those of 'facing transplantation'. Anxiety and conflict were prevalent throughout stages 2 and 3; the degree ranged from fleeting anxiety related to the procedure to internal and/or familial conflicts. Participants rarely had an opportunity to express their anxiety and conflicting feelings as they assumed that it would hurt the patient, cause family concern, and possibly result in the medical staff's canceling of the procedure. Stages 4 and 5

illustrate the psychological process of 'facing transplantation'. Participants did not commit to transplantation by going directly from stage 4 to stage 5. Rather, they fluctuated between these 2 stages and, although experiencing impatience and nervousness, finally underwent surgery. Participants became irritated with the prolonged waiting period. To maintain commitment to donation and to a healthy lifestyle, fighting against 'a sometimes overwhelming' fear was both mentally and physically straining. Deterioration of the patient's medical condition also became a matter of concern.

Papachristou *et al.* [5] suggest that the decision to donate was not based on a logical process, but rather was an emotional reaction toward a terminally ill recipient, a fear of loss, the desire to save a loved one, or an offshoot of family, social, or moral expectations.

Surgical complications may lead to physical, mental, and psychosocial problems that affect the quality of life (QoL) and psychological outcomes of living donors after transplantation. Therefore, it is important to precisely evaluate surgical complications, liver dysfunction, and QoL of living donors after the operation [6].

According to some studies, up to 67% of donors suffer postoperative complications [7–11] with an overall reported mortality of 0.2% and morbidity of 16% [12]. After donation, some donors may have to confront potentially life-threatening morbidity or even death; some may struggle with psychiatric problems or chronic symptoms for a long time after operation, whereas others feel fine and are willing to donate again [1]. In Egypt, long-term complications are essentially unknown after right donor hepatectomy because the procedure was not performed until August 2002 [13].

In recent times psychiatric complications suffered by the donor after donation have begun to receive particular attention. Fukunishi *et al.* [14] reported three cases without a psychiatric history that exhibited paradoxical psychiatric syndrome after donation. Trotter *et al.* [7] also reported that 4.1% of 392 liver donors suffered one or more psychiatric complications.

Postoperative care is an important element in understanding and improving long-term donor outcomes. Although most transplant programs evaluate medical health and physical well-being, formal psychosocial support after donation is rare [15].

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## Aim

The aim of the current study was to assess (i) the satisfaction with the decision to donate and willingness to donate again, (ii) the relation of satisfaction to postoperative complications, and (iii) the psychiatric morbidity and QoL of the donors.

## Design of the study

This is a descriptive prospective longitudinal study assessing the donor's satisfaction with the decision to

donate and willingness to donate again correlated with postoperative complications either surgically or psychiatrically.

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## Patients and methods

Donors were selected from the Liver Transplantation Unit in Ain Shams University Hospital, Wadi El-Nile Hospital, and Egypt Air Hospital. The study protocol was approved by the ethical committee of each hospital. The donors were informed about the nature of the study, and confidentiality of the obtained data was ensured. It was stated that participation in the study was voluntary and the participants had the freedom to withdraw at any time. A written consent form was signed by each participant.

## Operational definition

Potential donors are individuals who are excluded as donors because of medical and/or psychiatric disorders and therefore are not subjected to surgery; actual donors are those who are selected to undergo the surgical procedure of organ donation and may suffer from potential preoperative and postoperative psychological complications [16].

## Participants

Participants were recruited over 1 year starting from January 2010 to April 2011, with age range of 18–45 years; both men and women were included. A comprehensive medical evaluation of the potential donors was performed before referral. We used the General Health Questionnaire to assess minor psychiatric morbidity; those who scored above the cutoff score were further assessed by the Structured Clinical Interview for DSM-IV criteria (SCID-I) for diagnosis of psychiatric disorders. Those who were diagnosed with a psychiatric disorder on the basis of SCID-I were excluded. During this period of study, 65 participants were assessed. After the first visit 32 were excluded (11 died before surgery, three were excluded because of substance abuse problems, one was found to have bipolar disorder, one had a history of panic disorder, four were uncertain about donating, two declined when they received information about the recipient's condition and his chance for recovery, four were subjected to coercion by their families to donate, five left the hospital on the night of the surgery after they refused to donate without reasons, and one donor refused to sign the consent form). Thus we continued the study with 33 actual Egyptian donors.

## Visit schedule

Each patient was investigated over four visits (visit 1: just before donation; visit 2: 1 week after donation; visit 3: 1 month after donation; visit 4: 3 months after donation). The Beck Depression Inventory and Taylor's Manifest Anxiety Scale were administered in the four visits. In the three postoperative visits, modified version of the Clavien classification was administered, in addition to knowing the outcome of the recipient. PCASEE Quality of Life Questionnaire was administered in the first, third, and

fourth visit. Satisfaction from donation was assessed in the third visit. Psychiatric morbidity was assessed using SCID-I in the fourth visit.

### Tools and procedures

- (1) Preliminary interview using a designed sheet for personal history for assessment of the following domains: personal data, educational level, employment status, marital status, relation to recipient, satisfaction with donation, willingness, motivation to donate, and outcome of the recipient.
- (2) General Health Questionnaire [17]: it was initially developed as a first-stage screening instrument for psychiatric illness to identify potential cases, which could then be verified, and the nature of which could be determined by using a second-stage instrument such as a clinical interview schedule. The version used in this study was the Arabic version, with a cutoff point of 7 in the Egyptian community.
- (3) SCID-I [18]: the SCID was developed in the early 1990s to provide a standardized DSM-III-R Axis I diagnosis based on an efficient but thorough clinical evaluation. It has since been updated for DSM-IV. The semistructured diagnostic interview begins with a section on demographic information and clinical background. Then there are seven diagnostic modules, focused on different diagnostic groups: mood, psychotic disorder, substance abuse, anxiety, somatoform, eating, and adjustment disorders.
- (4) Beck Depression Inventory [19]: it is a self-rating scale to measure the depth and behavioral manifestations of depression and consists of 21 items, each of which has four responses of increasing severity. Numerical values from 0 to 3 are assigned to each statement to indicate the degree of severity (0–9, normal; 10–16, mild; 17–29, moderate; and  $\geq 30$ , severe). The Arabic version was used for the study.
- (5) Taylor's Manifest Anxiety Scale [20]: it is a self-rating scale consisting of 50 questions (long version) for assessment of anxiety. The total score indicates the severity of anxiety (0–16, normal; 17–25, mild; 25–36, moderate; and  $>36$ , severe anxiety). The Arabic version was used for the study.
- (6) PCASEE Quality of Life Questionnaire [21]: it is a clinical instrument designed for interview. It provides information on symptoms and functioning over the last month. It is a 30-item self-rating scale, completed on the basis of a semistructured interview in which the clinician completes ratings on the basis of a patient's self-reports and the clinician's judgment about the patient's functioning and life circumstances. The 30 items are rated from 0 to 5. High scores reflect less impaired or unimpaired functioning. Six domains are covered: physical component (P), cognitive component (C), affective component (A), social component (S), economic component (E), and ego functioning (E). The Arabic version was used for the study.
- (7) The modified version of the 'Clavien classification' [22]: the Clavien system defines a complication

as 'any deviation from the normal postoperative course'. The complication's severity is established using a system that includes interventions/medications that are required to treat or resolve the event, and outcomes of the event, and is composed of five grades from I to V: grade I, deviation from the normal postoperative course, but without the need for therapy; grade II, complication requiring pharmacologic treatment; grade III, complication with the need for surgical, endoscopic, or radiologic intervention [IIIa and IIIb, without/with the need for general anesthesia]; grade IV, life-threatening complication requiring intensive care; and grade V, death.

### Statistical analysis

The data were statistically analyzed using the statistical package for the social sciences (version 17; SPSS Inc., Chicago, Illinois, USA) software. Continuous variables were presented as mean  $\pm$  SD and categorical variables as absolute numbers (%). Categorical variables were compared using the  $\chi^2$ -test. Continuous normally distributed variables were compared using the two-tailed *t*-test. A *P*-value of 0.05 or less (two-tailed) was considered significant and a *P*-value of 0.01 or less was considered highly significant.

## Results

### Demographic data

The donors' ages ranged from 19 to 45 years (mean  $\pm$  SD:  $30.3 \pm 7.12$  years); there were 23 (69.7%) men and 10 (30.3%) women. The majority of donors were in a stable relationship, 20 of the 33 (60.6%) donors were married, and 13 (39.4%) were unmarried. About 60.5% of donors received school education,  $\sim 9\%$  were illiterate, and 30.3% were university graduates. A total of 66.7% of the donors were employed; 27.3% were manual workers, 24.2% were employed in clerical jobs, 15.2% were employed in managerial jobs, 21.2% were housewives, and 12% were students.

### Relation to the recipients

An overall 42.4% ( $n = 14$ ) of the donors were volunteers (had no relation with the recipient), whereas 24.2% ( $n = 8$ ) donated to their parents. The rest donated to first-degree or second-degree relatives.

### Outcome of recipients

Eighty-five percent ( $n = 28$ ) of recipients were alive at the second visit; the percentage decreased to 76% ( $n = 25$ ) at the third visit, and at the last visit only 73% ( $n = 24$ ) were still alive.

### Satisfaction with the decision to donate and willingness to donate again

The majority of actual donors (around 67%;  $N = 22$ ) reported that they would not donate again, whereas 33% ( $N = 11$ ) were willing to donate.

### Surgical complications

One week after surgery 88% of donors were classified as having grade 1 complications (deviation from the normal postoperative course, but without the need for therapy), 6% were classified as having grade 2 complications (one case had intraoperative bleeding and received blood transfusion, followed by biliary leak a few weeks later and 3 months later he had diabetes mellitus; another case developed wound infection and received antibiotics), and 6% had grade 3a complications (two cases had intra-abdominal blood collection requiring ultrasound-guided aspiration). One month after surgery 91% of donors had grade 1 complications, whereas 3% had grade 2 complications and the rest had either grade 3a (3%) or grade 3b (3%) complications. Three months after donation the majority (94%) reported having grade 1 complication, 3% had grade 2, and 3% had grade 3a complications. Interestingly the donor lethality was 0% (Table 1).

### The relation between quality of life and postoperative surgical complications in donors

There was no relation between QoL and surgical complications during the third and the fourth visit (Table 2).

### Psychiatric morbidity 3 months after donation

The psychiatric morbidity among donors was 15% ( $n = 5$ ); 6% ( $n = 2$ ) had anxiety disorders (one had panic attack and one had post-traumatic stress disorder), 6% ( $n = 2$ ) had major depressive episode of moderate severity, and 3% ( $n = 1$ ) had adjustment disorder with mixed anxiety and depression.

### Surgical complications and depression

Depressed donors had significantly higher frequency of surgical complications than did nondepressed donors ( $P = 0.01$ ) (Table 3).

### Surgical complications and anxiety

Anxious donors had significantly higher frequency of surgical complications than did nonanxious donors ( $P = 0.000$ ) (Table 4).

## Discussion

### Satisfaction with the decision to donate

Donors were asked about the possibility of donating again. The majority of actual donors (around 67%) reported that they would not donate again, whereas 33% were willing to donate. Donors who decided not to donate again had lost their recipients or had developed surgical complications; others had felt traumatized from the first 72 h after surgery while they were staying in the ICU; some experienced more pain than they had anticipated; others did not have enough information about the outcome of the surgery, which did not meet their expectations; and others, although regarding the donation as positive, were not willing to undergo it again.

**Table 1 Surgical complications of donors postoperatively**

Clavien's classification	Statistics [N (%)]		
	Visit 2	Visit 3	Visit 4
Grade 1	29 (87.9)	30 (90.9)	31 (93.9)
Grade 2	2 (6.1)	1 (3.0)	1 (3.0)
Grade 3a	2 (6.1)	1 (3.0)	1 (3.0)
Grade 3b	0 (0)	1 (3.0)	0 (0)

**Table 2 The correlation between quality of life and surgical complications at the fourth visit**

	Clavien's classification
PCASEE group P visit 4	
Pearson's correlation	-0.264
Significance (two-tailed)	0.138
N	33
PCASEE group C visit 4	
Pearson's correlation	-0.210
Significance (two-tailed)	0.241
N	33
PCASEE group A visit 4	
Pearson's correlation	-0.297
Significance (two-tailed)	0.093
N	33
PCASEE group S visit 4	
Pearson's correlation	-0.114
Significance (two-tailed)	0.528
N	33
PCASEE group E visit 4 economic	
Pearson's correlation	-0.116
Significance (two-tailed)	0.522
N	33
PCASEE group E visit 4 ego function	
Pearson's correlation	-0.201
Significance (two-tailed)	0.263
N	33
PCASEE total visit 4	
Pearson's correlation	-0.243
Significance (two-tailed)	0.173
Clavien's classification	
Pearson's correlation	1
Significance (two-tailed)	

**Table 3 Surgical complications and depression at the second visit**

Clavien's classification	BDI in visit 2 [n (%)]		$\chi^2$	d.f.	P value
	Nondepressed	Depressed			
Grade 1	24 (100)	6 (66.6)	23.80	6	0.01*
Grade 2	0 (0)	1 (11.1)			
Grade 3a	0 (0)	1 (11.1)			
Grade 3b	0 (0)	1 (11.1)			

BDI, Beck Depression Inventory.

\*Significant.

**Table 4 Surgical complications and anxiety at the second visit**

Clavien's classification	TMAS2 in second visit [n (%)]		P value
	Nonanxious	Anxious	
Grade 1	25 (96)	5 (71.4)	0.000*
Grade 2	0 (0)	1 (14.2)	
Grade 3a	1 (3.8)	0 (0)	
Grade 3b	0 (0)	1 (14.2)	

TMAS2, Taylor's Manifest Anxiety Scale in second visit.

\*Significant.

Contrary to our findings Trotter *et al.* [23] reported that all donors in their study would donate again, as they believed that they had benefited from the donation. Also, Erim *et al.* [16] reported that most of the donors (73.8%) reported that they would donate again, whereas 19.2% would not and 7% did not answer this question. In the group of patients who were unwilling to donate again, there were two donors who had lost their recipients and four donors who themselves had complications. In some studies donors did not regret their decision to donate saying that their lives had changed for the better and they would donate again [24–26].

Unfortunately, we were not able to analyze this discrepancy in findings because we did not assess the donors' satisfaction from the information given preoperatively about expectations and complications, nor the dynamics of the relation to the recipient and the satisfaction from the postoperative care in the follow-up period, as care efforts were devoted mainly to the donors during the evaluation period and to the recipients in the postoperative period. This shift in attention was previously reported by Beavers *et al.* [27].

#### **Surgical complications and relation to psychiatric morbidity and quality of life**

In our study we reported surgical complications mainly during the second visit (1 week after the surgery), which was 88% grade 1, 6% grade 2, and 6% grade 3a. By the fourth visit, about 94% of our donors reported having no complications.

Postoperative complications may reach up to 67% among donors; most of them are typical for a major abdominal surgery [7,8]. Some studies have shown that donor surgery is performed with minimal complications, including pain and gastrointestinal complaints [10,24].

Ran *et al.* [28] reported that 14 out of 105 living donors had postoperative complications, with 11 undergoing invasive treatment or reoperation. Among these medical complications, biliary events appear to be pronounced.

Lei *et al.* [6] found no donor mortality at their center, and the overall morbidity rate was 25.3%. Most of the complications of living donors were either grade 1 or grade 2. There were significantly fewer complications in the latter period of the study than in the initial period (19.9 vs. 32.6%), and biliary complications were the most common complications, with an incidence of 9%.

In Egypt, Esmat *et al.* [29] reported complications in 68% of donors (34 donors). Major complications included intraoperative bleeding in one, biliary leak in two, and pneumonia in three donors. Minor complications included mild pleural effusion in 13 donors, transient ascites in 10, intra-abdominal collections in three, and wound infections in one donor. In contrast, El-Meteini *et al.* [30] found that biliary complications occurred in 27 (13.0%) cases. Their results targeted mainly biliary complications rather than any other surgical complication.

Also, Gökçe *et al.* [26] reported major complications in three (9.4%) donors in the form of liver abscess, pleural

effusion, and intra-abdominal fluid collection, and minor ones among 14 (43.4%) donors, which were mainly pain around the surgical incision and gastrointestinal problems like nausea, vomiting, anorexia, and dyspepsia.

As a whole the surgical complications were found to be declining when our results were compared with previous studies conducted during the past 20 years. It could be attributed to the advances reached in liver transplant surgery achieved with increased experience.

In our study donors who developed surgical complications of grade 2 developed moderate depression and severe anxiety, those with grade 3a complications developed mild depression, and those who experienced grade 3b complications developed mild depression and moderate anxiety.

The pretransplant period can be extremely stressful. Declining health, uncertainty about the possibility of liver transplantation, and inability to continue working and participating in daily activities may increase the risk of depression and/or anxiety for the transplant candidate. Those patients who experience psychological distress before transplantation are likely to experience increased distress after transplantation, which may ultimately impact their recovery from transplantation [31]. El-Meteini *et al.* [32] found that female sex, low educational level, managerial job, being related as sib to the recipient, presence of depressive personality traits, and high scores in the Eysenck Personality Questionnaire psychoticism were independent risk factors for the development of depressive symptoms in liver donors.

Long-term follow-up of donors has revealed many interesting perspectives. More than half of the donors experienced more pain than they had anticipated [23]. They also found that the medical team and other family members perceived them as nonpatients. Even some donors perceived the recipients being more of patients than they were after the surgery. Donors worried about the lack of follow-up care and being ignored by the transplant team once the organ had been obtained. There are reports of increasing psychiatric disorders after donation with the prevalence in the same range as that of after kidney donation. Postdonation depression rates range between 0.2 and 15% [12]. However, psychiatric outcomes are not uniformly described because of limited donor follow-up after donation. The survey from transplant centers in France recommended life-time annual visits for all living donors [33]. Meeting with donors who had previously experienced the procedure also helped potential donors [2].

Erim *et al.* [16] reported that donors with severe complications had above-normal scores for psychological distress; they had higher scores of depression, compulsion, and paranoid ideation. They interpreted these symptoms as a psychological defense mechanism in a stressful life situation. Meanwhile, Gökçe *et al.* [26] found that psychological disruption in donors was not correlated with the presence of medical problems in the donors. In contrast, they noted a strong correlation between psychological disruption and presence of pro-

blems in the recipient. Conversely, Walter *et al.* [31] found no significant association between physical complications and psychiatric disorders among donors.

These differences from our study could be explained by the longer length of hospital stay of the donors who developed surgical complications in the hospital as they were subjected to greater stress; donors received less support from their family members during this period, as the concern shown by the family dwindled with longer length of stay.

In the current study there was no relation between surgical complications and QoL during the third and the fourth visit. Our findings confirm the results of Walter *et al.* [34] and DuBay *et al.* [35], who noted that the donors' medical complications were unrelated to their QoL. This observation also agrees with that of Lei *et al.* [6], who found that 98.4% of donors had returned to their previous levels of social activity and work, and 99.2% of donors would donate again. With the exception of two donors who experienced grade 3 complications and a few cases of abdominal discomfort, fatigue, chronic pain, and scar itching, none of the living donors were affected by physical problems.

Omar *et al.* [36] found significant reduction in the mean total score and in all subscales of the QoL, especially in the physical and social subscales, 1 month after donation, and at 3 months after transplantation the total QoL and all other domains had returned to their preoperative ranges.

In a study conducted by Erim *et al.* [16] all patients reported full recovery within an average period of  $14.41 \pm 8.86$  weeks. Another study reported that full activity was restored 14.3 weeks after donation [37].

Yet, Kousoulas *et al.* [38] demonstrated different findings as their donors who developed postoperative complications presented a lower QoL, especially in the categories of physical functioning, body pain, and social functioning. Also, Erim *et al.* [16] found that the more severe the donors' complications, the poorer the donors' perceived physical QoL. The difference in results could be due to the fact that most postoperative complications that occurred in our patients were less severe than complications reported by Erim *et al.* [16] and they resolved within 6 weeks of surgery.

In a review of 51 studies on outcomes of living donors, most donors were seen to have a positive response to donation, but negative psychological consequences were also found. Negative outcomes included feelings of unattractiveness, abandonment, disappointment, sensitivity, paranoia, aggression, obsession, anxiety, stress, and depression [39]. Other psychological problems such as low self-esteem, enhanced stress, and decreased confidence were also reported. These data remind us that the mental health of donors should not be neglected in long-term follow-up. However, only a small number of centers recognize the importance of prolonged postdonation monitoring and keep track of donor complications over time [40–42].

LDLT has changed the way of management of end-stage liver disease. Safe donor operation allows more patients to receive life-saving liver transplants. However, the safety of donors is not 100% guaranteed. Healthcare professionals have to cooperate throughout liver transplantation, from donor selection to postoperative follow-up. Preoperatively, radiologists, hepatologists, and psychiatrists need to work together to assess the suitability of potential donors and the selection of those eligible, as well as provide support and assistance in the decision-making process, which occasionally involves social workers familiar with liver transplantation.

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## Conclusion

The study showed that most donors are not motivated to donate again. Development of postoperative surgical complications was highly correlated with the development of depression and anxiety disorders. Meanwhile, we found no relation between surgical complications and QoL.

## Strength and limitations

The strength of our study is that it is one of the pioneer studies in Egypt that have explored psychological symptoms among Egyptian donors after liver transplantation and impact of surgery on their QoL. Yet, the study is limited by the small sample size, and hence its results cannot be generalized. There is also a need for evaluation of a larger number of patients over a longer period of more than 3 months to determine whether the character or severity of symptoms changes over time. At the same time, we did not assess the factors contributing to the decision-making process of the donors - whether it is based on the recipient's condition and the urgency for surgery, or the donor's motivation, or on family dynamics and cultural background.

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## Conflicts of interest

There are no conflicts of interest.

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