

Psychiatric Consultation of all Suicide-Attempt Patients during a One Year Period in a Tertiary Hospital

Rena Cooper-Kazaz MD

Psychiatric Outpatient Clinic, Department of Psychiatry, Hadassah Medical Center, Jerusalem, Israel

ABSTRACT: **Background:** Many tertiary hospitals provide psychiatric services that treat diverse clinical situations. Most patients referred to these services following a serious suicide attempt have psychiatric diagnoses, but their unique characteristics and needs are not known.

Objectives: To examine the files of patients hospitalized in a tertiary hospital in Israel following a serious suicide attempt. Their mental conditions were determined and their unique demographic and clinical characteristics and needs compared to the other patients examined by the psychiatric service.

Methods: The study focused on 49 consecutive patients admitted after performing a life-threatening suicide attempt. They were compared to 389 non-suicidal patients assessed by the same psychiatric service during one year.

Results: Nearly half the patients hospitalized following a serious suicide attempt had only an axis II diagnosis (personality disorder). Non-violent methods of suicide were used predominantly by females, and violent methods mainly by males. All suicide attempts by Muslims used violent methods, while less than half the attempts by Jews were violent. Compared to the non-suicidal patients, the suicide-attempters group was younger and had greater representation of Jewish females and Muslim males. Compared to the non-suicidal patients, these patients required more intense psychiatric care, earlier commencement of treatment in the course of hospitalization, more psychiatric visits and treatment hours, and more referrals for further care. Several risk factors appear to be associated with a need for more intense in-hospital care and a greater need for referral: male gender, religion, method of suicide attempt (violent vs. non-violent), and the existence of a psychiatric diagnosis.

Conclusions: Suicide-attempt patients who are in need of hospitalization for further medical treatment have unique clinical characteristics and require more intense treatment provided by the Consultation-Liaison Unit.

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The most common method of completed suicide involves the use of firearms, while drug ingestion is most frequent in unsuccessful suicide attempts. Although women attempt suicide more often than men, more suicide attempts result in death among males than among females [1]. In Israel, suicide attempt rates are 77.8/105 per year (females 64.3/105, males 92/105), while completed suicide rates are 7.2/105 (females 3.2/105, males 11.4/105) [2]. Although all three monotheistic religions prohibit suicide, in Israel the suicide rates are significantly lower in the Muslim population (61/105) than in the Jewish population (76.3/105) [3]. This may be attributed to the more religiously oriented lifestyle led by Muslims [4,5].

Major psychiatric diagnoses are documented in most patients who have attempted suicide or completed a suicide attempt [1]. These patients can nevertheless be divided into three clinical groups:

- *Completed suicides:* in this group mental disorders are present in more than 90% of the cases. They include mood disorders (30%–50%), substance abuse (15–25%), and psychosis (10–15%). Personality disorders have been diagnosed in only 10–15% of these patients [6,7].
- *All patients assessed in the emergency room after a suicide attempt:* Suominen and co-authors [8] found that 98% of suicide attempters admitted to the ER had at least one major psychiatric diagnosis (axis I diagnosis): major depression (38%), alcohol related (50%), or psychosis (11%). Interestingly, personality disorder was found to be present in 40% of these cases.
- *A subgroup of patients assessed in the medical wards after a serious suicide attempt severe enough to warrant medical hospitalization:* Ramdurg et al. [9] found the main psychiatric diagnoses to be personality traits (24%), depression (19%), schizophrenia and psychotic disorders (18.5%); 18% had no psychiatric diagnosis [9]. Gupta and Trzepacz [10] compared 207 serious overdose patients, 53 non-overdose self-injury patients, and 79 medical patients with suicidal ideation, all of whom were admitted for hospitalization.

ER = emergency room

Most had an axis I psychiatric diagnosis, with a similar prevalence in all groups. Of interest was the difference in rates of personality disorder (axis II diagnosis) between the groups (non-overdose self-injury patients 17%, suicidal ideation 20.2%, overdose 27.6%). The overdose patients were predominantly female (60%), while the non-overdose self-injury and suicidal ideation patients were predominantly male (72%) [10].

The main function of Consultation-Liaison psychiatry in general hospitals is to recognize and treat psychiatric disorders that appear in the medically ill [11]. The proportion of time and management dedicated to suicide attempters is unknown. Over a 10 year research period (1997–2007), 6.9% of consultations were found to be due to suicide attempts [12]. In the Ramdurg study in 2011 the lowest rate of psychiatric consultations was for suicide referrals (5.3%) [9], while other studies noted rates as high as 12.2% [13] and 19% [14].

Optimally, all patients who deliberately harm themselves should be referred for psychiatric assessment [15,16]. Such referrals have proven to be crucial for long-term management [17,18]. In a large 1 year study, more than 1000 consecutive suicide-attempt patients were treated in emergency rooms. Only 56% of these patients received psychiatric consultation after the attempt or during the subsequent year. Those referred complied with psychiatric treatment and generally did better than those not treated [19]. Another study of 1348 suicide attempters suggested three main patient categories: those in need of further hospitalization in “critical care centers,” those requiring psychiatric hospitalization, and repeated suicidal behavior that did not necessitate hospitalization [20].

The present study focuses on patients hospitalized after a life-threatening suicide attempt. This study examined their mental condition, clinically and demographically evaluated subgroups of the suicide attempters, compared characteristics of suicide attempters with the other patients treated by the CL unit, and documented the burden on CL services related to suicide attempts.

PATIENTS AND METHODS

The study included all patients hospitalized in various medical departments after attempting suicide in 2006. The sample was compared to all other CL consultations during the same period.

All CL visits were recorded in patients’ files. The patients’ principal DSM-IV-TR psychiatric diagnosis (axis I – major psychiatric disorders or axis II – personality disorders) was made by the senior CL psychiatrist. The following variables

were analyzed: age, gender, religion, length of hospital stay (in days), time to referral (in days), time from admission to medical department until first CL assessment, method of suicide attempt, number of CL visits, number of consultation hours, and type of discharge/referral for further treatment (psychiatric hospital, nursing home, rehabilitation, hospice, retirement home).

STATISTICAL ANALYSIS

Statistical analysis was performed using the SPSS statistical package (SPSS Inc., Chicago, IL, USA). A Pearson chi-square test was used to analyze the significant differences between parameters. A *t*-test (for independent samples) was used to analyze the differences between age, time to treatment, length of stay, and number of visits. A *P* value < 0.05 was considered statistically significant.

RESULTS

Table 1 presents the demographic characteristics of the study patients. In the course of the study period, 49 patients (11.2%) were assessed after a suicide attempt and 389 (88.8%) were assessed for other reasons. The mean age of suicide attempters was significantly lower than that of non-suicidal patients (*P* < 0.001). In the population of suicide attempters, the difference in mean age between the genders was not significant. The general population in Israel is 75% Jewish, 17% Muslim, and 8% other [6]. The non-suicidal group reflects the demographics of the population served by the hospital. Among suicide attempters, significantly more Jewish females (63.4%) and Muslim males (75%) were hospitalized compared to their percentages in the non-suicidal group (*P* = 0.045).

METHOD USED IN SUICIDE ATTEMPT [Table 2]

The method used in suicide attempts was categorized as non-violent such as medication overdose (25 cases, 51%) or violent (24 cases, 49%), which was further divided into six categories [Table 2]. Females comprised the majority of non-

Table 1. Demographic characteristics of 389 non-suicide and 49 suicide attempters

	Non-suicide	Suicide				
	389 (88.8%)	49 (11.2%)				
Age (yr, mean)*	56.9	45				
Age by gender (mean)	Male	Female	P	Male	Female	P
	55.8	58.4	0.2	40.6	38	0.6
Religion*						
Jewish	189 (92.6%)	159 (85.9%)	0.2	15 (7.4%)	26 (14.1%)	0.045
Muslim	21 (77.8%)	14 (87.5%)		6 (22.6%)	2 (12.5%)	
Christian	1 (0.5%)	4 (1.9%)		0	0	

**P* < 0.001

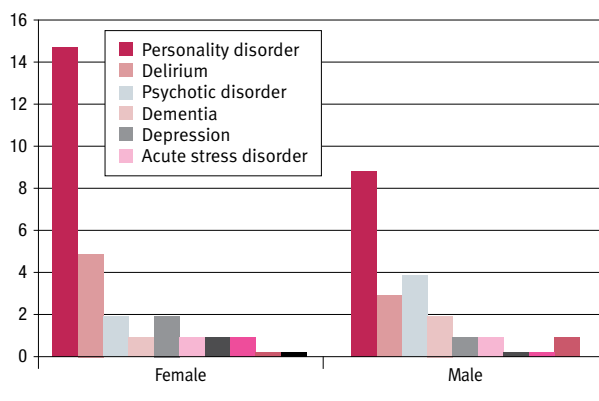
** The religion of one subject is unknown

CL = consultation-liaison

Table 2. Suicide attempters categorized by method of attempt and gender

Method of suicide attempt		Male	Female	Total	P
Total	N	21	28	49	
	% within method	42.9%	57.1%	100%	
	% within gender	100%	100%	100%	
Non-violent (overdose)	N	5	20	25	
	% within method	20%	80%	100%	
	% within gender	23.8%	71.4%	51%	
Violent (total)	N	16	8	24	< 0.001
	% within method	66.7%	33.3%	100%	
	% within gender	76.2%	28.6%	49%	
Jumping from height	N	8	5	13	0.112
	% within method	61.5%	38.5%	100%	
	% within gender	38.1%	17.9%	26.5%	
Gunshot	N	3	1	4	0.17
	% within method	75%	25%	100%	
	% within gender	14.3%	3.6%	8.2%	
Self-inflicted burns	N	2	0	2	0.09
	% within method	100%	0%	100%	
	% within gender	9.5%	0%	4.1%	
Knife	N	2	0	2	0.09
	% within method	100%	0%	100%	
	% within gender	9.5%	0%	4.1%	
Caustic fluid ingestion	N	0	2	2	0.2
	% within method	0%	100%	100%	
	% within gender	0%	7.1%	4.1%	
Foreign body ingestion	N	1	0	1	0.24
	% within method	100%	0%	100%	
	% within gender	4.8%	0%	2%	

Figure 1. Psychiatric diagnoses of suicide attempters according to gender



violent attempters (80%) and only a minority among violent attempters (33.3%). Among the male attempters, 76.2% used violent methods while only 28.6% of the females chose these methods ($P < 0.001$). The risk of a violent suicide attempt was eight times higher in males than in females (odds ratio 8, 95% confidence interval 2.188–29.249). Age did not affect method of attempt for either gender. All suicide attempts by Muslim patients used violent methods (2 females, 6 males).

Among Jewish attempters, 39% used violent methods and 61% non-violent methods ($P = 0.002$).

PSYCHIATRIC DIAGNOSES [Figure 1]

All suicide attempters were diagnosed as suffering from either a major psychiatric disorder (axis I) or a personality disorder (axis II): 49% were diagnosed with a personality disorder, 16.2% with a psychotic disorder, 12.2% with depression, 6.1% with delirium, 6.1% with dementia, 4.1% with acute stress disorder and 2% with adjustment disorder; 2% of suicide attempts were alcohol related and 2% were drug related. The diagnosis of personality disorder refers primarily to borderline personality disorder. In the group of patients diagnosed with personality disorders, only 37.5% used violent methods; most of these were males. In a multivariate analysis, the only significant factor found to contribute to method of suicide attempt was gender.

PSYCHIATRIC INTERVENTION

The mean number of visits to the CL unit per patient was significantly higher for the suicide attempters than for non-suicidal patients: 3.47 vs. 2.13 ($P = 0.001$). In the group of suicide attempters, the method of suicide did not affect the number of visits. The mean length of hospital stay did not differ between non-suicide patients and suicide attempters: 22.8 days vs. 22.77 days. However, length of stay was significantly longer for violent attempters than for non-violent attempters: 34.23 vs. 12.68 ($P = 0.009$). In addition, the mean time to treatment was significantly shorter for suicide attempters compared to non-suicidal patients: 5.38 vs. 9.31 ($P = 0.036$), although it was longer for violent attempters than for non-violent ones: 8.41 vs. 2.81 ($P = 0.05$).

DISCHARGE AND REFERRALS

The discharge/referral pattern of the 389 non-suicidal patients was as follows: 60.2% were referred for ambulatory psychiatric treatment, 21.6% for treatment in another facility, 9.7% for psychiatric hospitalization, and 8.5% died during their hospital stay. In the group of 49 suicide attempters, 47% were discharged home, while 53% were referred elsewhere: 38.8% to a psychiatric hospital, 6.1% to a nursing home, 4.1% to a hospice, and 2% each to a rehabilitation facility or retirement home. Of the 24 violent attempters, 29.2% were discharged home, compared to 64% of the 25 non-violent attempters ($P = 0.047$).

Table 3 depicts the discharge/referral of suicide attempters according to psychiatric disorder. The psychiatric diagnoses of the patients who were discharged home were as follows: personality disorder was diagnosed in 65.2%, depression in 8.7%, psychotic disorder in 4.4%, and other disorders in 21.7%. Only 30.4% of these patients had used a violent method in their suicide attempt. By contrast, the psychiatric diagnoses of the patients who were referred for further treatment were: personality disorder in 34.6%, psychotic disorder in 27%, depression in 15.4%, and other

Table 3. Discharge/referral of suicide attempters according to psychiatric disorder

Psychiatric disorder		Home	Psychiatry or other facilities*	Total	P
Personality disorder	N	15	9	24	0.032
	% within disorder	62.5%	37.5%	100%	
	% within discharge	65.2%	34.6%	49%	
Psychotic disorder	N	1	7	8	0.033
	% within disorder	12.5%	87.5%	100%	
	% within discharge	4.4%	27%	16.3%	
Depression	N	2	4	6	NS
	% within disorder	33.3%	66.7%	100%	
	% within discharge	8.7%	15.4%	12.2%	
Other diagnoses**	N	5	6	11	NS
	% within disorder	45.5%	54.5%	100%	
	% within discharge	21.7%	23%	22.5%	
Total	N	23	26	49	
	% within disorder	46.9%	53.1%	100%	
	% within discharge	100%	100%	100%	

*Other facilities: nursing home, rehabilitation, hospice, retirement home (including patients who died during hospitalization)

**Other diagnoses: dementia, delirium, acute stress disorder, adjustment disorder, alcohol related and drug abuse

disorders in 23%. Of these patients, 65.38% had used a violent method.

Among patients with personality disorders, 62.5% were discharged home as compared to 32% of non-personality disorder patients ($P = 0.032$). The majority of those discharged home had attempted a non-violent method of suicide (73.3%). Among psychotic patients, 87.5% were referred for further treatment as compared to 46.3% of the non-psychotic patients ($P = 0.033$).

Of all the males, only 38.1% were discharged home; these were younger (32.8 vs. 46.25, $P = 0.077$) and had used non-violent methods. Of the male violent attempters, only 31.3% were discharged home as compared to 60% of the non-violent attempters. Most (84.6%) of the males referred for further treatment had used a violent method. Of all the 28 females, 53.6% were discharged home; most had used non-violent methods. Of the female violent suicide attempters, only 25% were discharged home as compared to 65% of the non-violent attempters ($P = 0.055$). Only 46.2% of the females referred for further treatment had used a violent suicide method. Females using violent methods needed significantly more treatment hours than those using non-violent methods (8.5 vs. 2.9 hours, $P = 0.014$). Age, time to treatment and length of stay did not affect discharge.

DISCUSSION

The results of this study show that:

- Nearly half (49%) the severe suicide attempters did not have an axis I disorder upon attempting suicide and were diagnosed as suffering from an axis II – personality disorder only.

- The non-violent method of suicide was used predominantly by females, while violent methods were used predominantly by males (80% vs. 66.7%). The estimated risk of performing a violent suicide attempt was eight times higher in males. In our study, all suicide attempts among Muslims (both female and male) used violent methods compared to 39% of the attempts among Jewish patients.
- A little over 11% of the 438 patients examined by the CL unit were hospitalized because they had attempted suicide. These patients were significantly younger (with a mean age approaching 40) compared to the other CL patients. While 54.2% of the general CL patient population was male, the suicide-attempt group had a significantly higher percentage of females (57.1%). There was a higher representation of Muslims in the suicide-attempt group (16.3%) than in the general CL population (9.8%), with a clear majority of Muslim males. Finally, there were significantly more Jewish females in the suicide-attempt group compared to the general CL population.
- As a group, suicide-attempt CL patients were more in need of psychiatric care than other CL patients. They were treated earlier on, and they needed more psychiatric visits and treatment hours. The significant differences in the need for care by violent vs. non-violent attempters were firstly that female violent suicide attempters needed more in-hospital care, and secondly, that psychiatric treatment was delayed for the violent group due to the need for urgent physical care. Suicide attempters were also in greater need of referrals for further care. While most (60.2%) non-suicide attempters were discharged home, only 47% of the suicide attempters were discharged (64% of the non-violent attempters, and 29.2% of the violent attempters; 38.1% males and 53.6% females). The rest were referred for further treatment at other facilities.

Several risk factors appear to be associated with more intense in-hospital care and a greater need for referral, thus placing a heavier burden on the CL unit. Male gender, in itself a strong risk factor, seems to have overshadowed all other characteristics (method of suicide attempt and psychiatric diagnosis). For female patients and all Muslim patients, the method of suicide attempt greatly affected the need for further care (violent attempters tended to need further hospitalization). Violent suicide attempters needed more referrals to other facilities. Personality disorder was usually associated with non-violent suicide attempts, and continuous care was rarely indicated in these cases. Finally, violent attempts were seen in patients with psychotic disorders, who usually need further care.

The first finding, that half the suicide-attempt patients were diagnosed as suffering from personality disorder and had no major axis I diagnoses, is in contrast with the litera-

ture, which found major axis I psychiatric diagnoses in most patients who attempted or completed suicide. The clinical population most similar to the current study appears in the study by Ramdurg et al. [9], who found personality traits in 24% of their patients and a similar rate of psychotic, mood, and non-psychiatric diagnoses (18–19%). The Gupta and Trzepacz study found four main axis I diagnoses, with similar prevalence in all groups: adjustment disorder, depressive disorder, substance-related disorders, and organic-mental disorders. Lower rates were found for personality disorders, 17–28%, depending on the subgroup [10]. Our finding of a large population suffering from personality disorders is more in line with the study by Suominen et al. [8]; they noted that in the general population presenting to the ER after a suicide attempt 40% had personality disorders and were not in need of further hospitalization. This finding may reflect the unique characteristics of the population served by our hospital. Our findings may also suggest a possible escalation in the severity of suicide attempts in the personality disorder population. Although in most studies the severity of personality disorder suicide attempts was at the lower end of the spectrum and did not necessitate further physical hospitalization, this may be changing and the change may need to be addressed.

The second finding, that a non-violent method of suicide was used predominantly by females while violent methods were used predominantly by males, concurs with other studies assessing gender differences in suicide-attempt methods. The Jewish/Muslim ratio in our study population does reflect the population served by this hospital. However, it is not in line with Israeli statistics that found Muslims to have a reduced risk of suicide [3]. The possible explanation may lie in the urban characteristics of Muslims in the greater Jerusalem area, who may not differ from the Jewish population in their risk of suicide. In addition, in the Muslim population the attempts used violent methods. One may speculate that the Muslim population in this catchment area may have specific social and demographic constraints that further raise their risk of suicide and should be assessed and addressed on a social level.

The third finding was that the proportion of suicidal patients treated by the psychiatric CL unit (11.2%) is average compared to the proportions found by others (6.9–19%), and is most similar to those (12.2%) found by Lyne [13]. The percentage of women in our suicide-attempt group (57.1%) was similar to that in other studies (58.4%) [12]. Also, the suicide-attempt group was younger than those admitted for other reasons (39.2 vs. 54.9), as seen in the Alberdi-Sudupe study (42.5 vs. 51.5) [12].

The fourth finding suggests that suicide-attempt patients are in need of greater overall in-hospital psychiatric care and more referrals for further care as compared to the other CL patients. Our findings agree with Suominen et al. [19] who found that 25% of ER suicide-attempt patients needed a referral for psychiatric hospitalization. We further characterized features of

suicide attempters who were in greater need of further care (gender, method of suicide attempt, religion, psychiatric disorder) and our results are partly in line with Kudo and colleagues [20], who specified three main categories of patients. Finally, most studies emphasize the importance of referring patients for psychiatric assessment and continuous psychiatric care, since such referrals improve long-term outcomes [17–19].

LIMITATIONS AND SHORTCOMINGS

Suicide-attempt patients are in greater need of CL services than other patients, and this paper sought to address this group of patients and their unique needs. This study collected data of a CL psychiatric unit's work over a 1 year period. This unit was predominantly a "one-woman show," a fact that facilitated the homogeneous collection of data. The service did not operate during the night and over weekends and, therefore, the patients treated exclusively during those hours were not recorded. All other patients needing continuous care were referred to the unit. Another limitation is the fact that the hospitalized suicide attempters in our study were not compared to patients treated by the ER and discharged after a milder suicide attempt. In addition, the study population is small, especially the Muslim population. These limitations affect the ability to generalize the findings and should be taken into consideration when applying them to the general Israeli population. Finally, a long-term follow-up would help assess the effectiveness of the psychiatric intervention and the decisions regarding the patients' discharge plans.

CONCLUSIONS AND RECOMMENDATIONS FOR THE FUTURE

This is the first such study performed in Israel in a tertiary hospital serving a large catchment area. It is unique in its focus on suicide-attempt patients in need of hospitalization for further medical treatment. It sheds light on the specific characteristics of these patients: their socio-demographic parameters, the severity of their attempts, their unique in-hospital needs, and their referral patterns. Special attention should be paid to the possible escalation in suicide-attempt severity among personality disorder patients. Finally, these results can aid in understanding the challenges that CL units in general hospitals are expected to face. It can assist in the development of such units in order to better address the specific needs of patients hospitalized after a suicide attempt. Further studies in the field of CL psychiatry are needed to enhance our understanding of these patients' clinical characteristics and match their clinical needs.

Address for correspondence:

Dr. R. Cooper-Kazaz

Psychiatric Outpatient Clinic, Department of Psychiatry, Hadassah Medical Center, P.O. Box 12000, Jerusalem 91120, Israel

Phone: (972-2) 677-6348

Fax: (972-2) 677-7938

email: crena@hadassah.org.il

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Capsule

Nucleation of platelets with blood-borne pathogens on Kupffer cells precedes other innate immunity and contributes to bacterial clearance

Through the use of intravital imaging of the liver, Wong et al. demonstrate a collaborative role for platelets with Kupffer cells (KCs) in eradicating blood-borne bacterial infection. Under basal conditions, platelets, via the platelet-adhesion receptor GPIIb, formed transient ‘touch-and-go’ interactions with von Willebrand factor (vWF) constitutively expressed on KCs. Bacteria such as *Bacillus cereus* and methicillin-resistant *Staphylococcus aureus* (MRSA) were rapidly caught by KCs and triggered platelets to switch from ‘touch-and-go’ adhesion to sustained GPIIb-

mediated adhesion on the KC surface to encase the bacterium. Infected GPIIb-deficient mice had more endothelial and KC damage than did their wild-type counterparts, which led to more fluid leakage, substantial polycythemia and rapid mortality. This study identifies a previously unknown surveillance mechanism by which platelets survey macrophages that rapidly converts to a critical host response to blood-borne bacteria.

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Eitan Israeli

Capsule

Hepatitis C virus infection activates an innate pathway involving IKK-α in lipogenesis and viral assembly

Hepatitis C virus (HCV) interacts extensively with host factors to not only establish productive infection but also trigger unique pathological processes. In a recent genome-wide siRNA screen Li and co-researchers demonstrated that IκB kinase-α (IKK-α) is a crucial host factor for HCV. Here they describe a new nuclear factor κB (NF-κB)-independent and kinase-mediated nuclear function of IKK-α in HCV assembly. HCV, through its 3' untranslated region, interacts with DEAD box polypeptide 3, X-linked (DDX3X) to activate IKK-α, which translocates to the nucleus and induces a CBP/p300-mediated transcriptional program involving sterol regulatory element-binding proteins

(SREBPs). This innate pathway induces lipogenic genes and enhances core-associated lipid droplet formation to facilitate viral assembly. Chemical inhibitors of IKK-α suppress HCV infection and IKK-α-induced lipogenesis, offering a proof-of-concept approach for new HCV therapeutic development. These results show that HCV uses a novel mechanism to exploit intrinsic innate responses and hijack lipid metabolism, which may contribute to high chronicity rates and the pathological hallmark of steatosis in HCV infection.

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Eitan Israeli