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ORIGINAL ARTICLE

CLINICAL CHARACTERISTICS OF ADULTS, OLDER ADULTS, AND VERY OLD ADULTS HOSPITALIZED IN INTENSIVE CARE UNITS

CARACTERÍSTICAS CLÍNICAS DE ADULTOS, IDOSOS E MUITO IDOSOS INTERNADOS EM UNIDADES DE TERAPIA INTENSIVA

CARACTERÍSTICAS CLÍNICAS DE ADULTOS, ADULTOS MAYORES Y ANCIANOS HOSPITALIZADOS EN UNIDADES DE CUIDADOS INTENSIVOS

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ABSTRACT

Objective: to compare the clinical characteristics of adult, older adult, and very old adult patients admitted to intensive care units (ICU). ***Method:*** retrospective, longitudinal and comparative type study, by means of which 279 adults (aged ≥18 and <60 years), 216 older adults (aged ≥60 and <80 years), and 105 very old adults (aged ≥80 years) were assessed. The research was approved by the Research Ethics Committee, Protocol No. 845/2009. ***Results:*** the group of adults differed from the other groups with respect to the presence of some comorbidities and renal insufficiency in hospitalizations at the ICUs, in addition to differing in the Simplified Acute Physiology Score (SAPS II) and the Logistic Organ Dysfunction Score (LODS) at ICUs admission and discharge. Regarding adults and older adults, the differences were also related to the number of organic insufficiencies and mortality. Differences between all groups were observed in the assessment of origin of referral and history of diseases of the circulatory system. ***Conclusion:*** the group of adults differed from the other groups in various aspects; however, there was relevant difference in the clinical characteristics between older adults and very old adults. ***Descriptors:*** Age Groups; Index of Disease Severity; Intensive Care Units.

RESUMO

Objetivo: comparar as características clínicas de pacientes adultos, idosos e muito idosos admitidos em unidades de terapia intensiva (UTI). ***Método:*** estudo retrospectivo, longitudinal, do tipo comparativo, por meio do qual foram analisados 279 adultos (≥18 e <60 anos de idade), 216 idosos (≥60 e <80 anos de idade) e 105 muito idosos (≥80 anos de idade). A pesquisa foi aprovada pelo Comitê de Ética em Pesquisa, Protocolo nº 845/2009. ***Resultados:*** o grupo de adultos diferiu dos outros grupos em relação à presença de algumas comorbidades e insuficiência renal nas internações nas UTIs, além de diferirem nos sistemas de classificação *Simplified Acute Physiology Score* (SAPS II) e no *Logistic Organ Dysfunction Score* (LODS) na admissão e alta das UTIs. Entre adultos e idosos, as diferenças também foram em relação ao número de insuficiências orgânicas e mortalidade. Diferenças entre todos os grupos foram observadas na análise da procedência e dos antecedentes relacionados às doenças do aparelho circulatório. ***Conclusão:*** o grupo de adultos diferiu dos demais grupos em vários aspectos; porém, houve diferença relevante nas características clínicas entre idosos e muito idosos. ***Descritores:*** Grupos Etários; Índice de Gravidade de Doença; Unidades de Terapia Intensiva.

RESUMEN

Objetivo: comparar las características clínicas de pacientes adultos, adultos mayores y ancianos ingresados en unidades de cuidados intensivos (UCI). ***Método:*** estudio retrospectivo y longitudinal de tipo comparativo, por medio del cual fueron analizados 279 adultos (≥18 y <60 años de edad), 216 adultos mayores (≥60 y <80 años de edad) y 105 ancianos (≥80 años de edad). La investigación fue aprobada por el Comité de Ética en Investigación, Protocolo N° 845/2009. ***Resultados:*** el grupo de adultos se diferenció de los otros grupos por la presencia de algunas comorbilidades e insuficiencia renal en hospitalizaciones en las UCIs, además de diferir en los sistemas de clasificación *Simplified Acute Physiology Score* (SAPS II) y *Logistic Organ Dysfunction Score* (LODS) en la admisión y alta de las UCIs. Entre los adultos y los adultos mayores, las diferencias fueron también en relación con el número de insuficiencias orgánicas y mortalidad. Se observaron diferencias entre todos los grupos en el análisis del lugar de derivación y los antecedentes de enfermedades del sistema circulatorio. ***Conclusión:*** el grupo de adultos se diferenció de los otros grupos en diversos aspectos; sin embargo, hubo diferencia relevante en las características clínicas entre los adultos mayores y los ancianos. ***Descriptores:*** Grupos Etarios; Índice de Gravedad de Enfermedad; Unidades de Cuidados Intensivos.

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INTRODUCTION

Intensive care units (ICU) are hospital sectors that provide care to critical patients who require continuous intensive monitoring and specialized therapeutic support. In this context, the characterization of patients admitted to ICUs has been the subject of several studies concerned with mapping accurately this specific clientele who needs therapeutic and increasingly distinct care.[1-3] The adequacy of care provided to this specificity entails incessant pursuit of the best way to promote the recovery of impaired abilities in each patient.

Within the complexity of care provided to these patients, it is worth noting the progressive increase of older adults who require intensive care and exhibit different physiological characteristics subject to greater risk of worsening. The exponential growth of the older adult population—especially in developing countries—has been observed for approximately 40 years. In Brazil, there is a projection of 32 million individuals aged 60 years or more for 2025.[4]

Given this increase in life expectancy, a new classification has been created which subdivides the population aged over 60 years into two groups, i.e., older adults and very old adults, the latter being characterized by individuals aged 80 years or more. The evident existence of a plateau in the curve of mortality of individuals aged over 80 years—the curve of mortality ceases to increase in this age group and tends to stability or reduction—encourages the understanding of the reason why growth is more pronounced in the group of very old adults with respect to individuals aged between 60 and 79 years.[5]

This global population ageing poses medical and socioeconomic challenges to government agencies and society. As this demographic change arises, there is an epidemiological transition with increase of chronic degenerative diseases[4,6] and changes in morbidity and mortality patterns. Therefore, the understanding of older adult and very old adult populations—increasingly expressive in the population and exhibiting distinct physiological characteristics, subject to greater risk of aggravation and death—can promote care with optimization of resources available in the ICUs, aiming at quality care and improvement in the prognosis of the patients.

The scarce number of studies that characterize and differentiate patients admitted to ICUs, subdivided into the categories "adults", "older adults", and "very old adults", strengthens the importance of the present study that will be able to identify new possibilities for treatment and care in the light of possible specificities between these groups. Given the above considerations, the goal of this study is:

- To compare the clinical characteristics of adult, older adult, and very old adult patients admitted to intensive care units.

METHOD

This is a retrospective, longitudinal and comparative type study. The primary source of the research was an electronic database of patients hospitalized in four ICUs of two public hospitals and two private hospitals. The institutions selected met the following criteria: medium, large, or extra large size; located in the city of São Paulo; and having general ICUs and semi-intensive units.

Patients included were aged ≥18 years and admitted to the selected ICUs during the period of data collection, which began in August 2006. This was a daily activity performed until obtaining 150 patients per hospital, which occurred in January 2007. The series was divided into three groups: 279 adults (aged ≥18 and <60 years); 216 older adults (aged ≥60 and <80 years); and 105 very old adults (aged ≥80 years).

The severity of the patients was measured by the risk of death calculated by the indexes Simplified Acute Physiology Score II (SAPS II)[7] and Logistic Organ Dysfunction Score (LODS)[8] at ICUs admission and discharge.

Pearson's chi-square test was used to assess the nominal dependent variables (Comorbidities according to the International Classification of Diseases [ICD-10], origin of referral, type of organic insufficiency according to the LODS, and mortality). When the result of this test identified statistically significant difference between the groups ($p \leq 0.05$), an additional assessment was performed between the following pairs of groups: adults *vs.* older adults; older adults *vs.* very old adults; and adults *vs.* very old adults, in order to identify those that differed between the three groups.

The numeric dependent variables (number of organic insufficiencies according to the LODS, length of stay at the ICUs, and severity according to the SAPS II and LODS) were subject to Kolmogorov-Smirnov test to find the distribution type: normal ($p > 0.05$) or abnormal ($p \leq 0.05$). Kruskal-Wallis test was used due to the abnormal distribution. Due to statistically significant difference between groups ($p \leq 0.05$), the Kruskal-Wallis multiple

comparison test was used to identify the groups that exhibited the value of the difference observed greater than the value of critical difference, characterizing statistically significant difference between them.

The significance level adopted in all the assessments was 5%. The study received a favorable opinion from the Research Ethics Committee of the School of Nursing of the University of São Paulo (No. 845/2009/CEP-EEUSP).

RESULTS

The assessment of 600 patients showed that the average length of stay in the ICUs was 8.9 days, with a variation ranging from one to 79 days. Most patients had been referred from surgical centers (36.06%) or emergency rooms (35.39%). The most frequent medical history was related to diseases of the circulatory system (56.17%) and the mortality rate in ICUs was 20%.

The average of risk of death according to the SAPS II and the LODS at admission was 25.50 (±22.12) and 21.43 (±18.66), respectively. The majority of individuals exhibited one (34.75%) or two (38.67%) organic insufficiency, and renal (69.68%) and pulmonary (49.91%) were the most frequent. Regarding sex, male individuals were prevalent (56.50%). Most patients were older adults aged over 60 years (53.50%). The average and the median age were 60.76 and 62 years, respectively.

The groups (adults, older adults, and very old adults) differed between them with respect to the following comorbidities: neoplasias (p = 0.00); endocrine, nutritional, and metabolic diseases (p = 0.00); diseases of the nervous system (p = 0.05); and diseases of the circulatory (p = 0.00), respiratory (p = 0.00), and genitourinary (p = 0.01) systems.

The comparison of the pairs of groups through the chi-square test showed that the group of adults differed from the group of older adults with respect to: medical history of neoplasias (p = 0.00); endocrine, nutritional, and metabolic diseases (p = 0.00); diseases of the circulatory system (p = 0.00); diseases of the respiratory system (p = 0.00); and diseases of the genitourinary system (p = 0.01). Compared to the group of very old adults, the group of adults differed with respect to: endocrine, nutritional, and metabolic diseases (p = 0.00); diseases of the nervous system (p = 0.01); and diseases of the circulatory (p = 0.00), respiratory (p = 0.00), and genitourinary (p = 0.01) systems. In addition, the group of very old adults differed from the group of older adults due to increased frequency of medical history related to the circulatory system (p = 0.05).

Table 1. Distribution of patients admitted to ICUs (n = 599*), according to age groups and origin of referral. São Paulo, 2006-2007.

Origin of referral	Age groups						p**
	Adults (aged ≥18 and <60 years)		Older adults (aged ≥60 and <80 years)		Very old adults (aged ≥80 years)		
	No.	%	No.	%	No.	%	
Admission Units	17	6.12	20	9.26	20	19.05	.00
Semi-Intensive	17	6.12	31	14.35	20	19.05	
Emergency room	108	38.85	69	31.94	35	33.33	
Surgical center	114	41.00	76	35.19	26	24.76	
Other origins of referral	22	7.91	20	9.26	4	3.81	

*_missing_: one in the age group aged between ≥18 and <60 years.
**chi-square test.

Table 1 shows that there was statistically significant difference between the age groups assessed with respect to the variable "origin of referral" (p = 0.00). The comparison of pairs of groups through the chi-square test showed that all groups exhibited significant difference between them: adults and older adults (p = 0.01); adults and very old adults (p = 0.00); and older adults and very old adults (p = 0.02).

Almost 80% of the adult patients had been referred to the UTIs from surgical centers and emergency rooms. Regarding older adults and very old adults, the percentage was 67.13 and 58.09%, respectively. The category "other origins of referral" included primarily patients from other hospitals and procedure rooms.

Table 2. Distribution of patients admitted to ICUs (n = 587*) considering age groups and number of organic insufficiencies according to the LODS. São Paulo, 2006-2007.

Number of organic insufficiencies (LODS)	Age groups						p**
	Adults (aged ≥18 and <60 years)		Older adults (aged ≥60 and <80 years)		Very old adults (aged ≥80 years)		
	No.	%	No.	%	No.	%	
Zero	36	13.33	8	3.74	6	5.83	.01
One	97	35.93	76	35.51	31	30.10	
Two	92	34.07	90	42.06	45	43.69	
Three	36	13.34	30	14.02	16	15.53	
Four and five	9	3.33	10	4.67	5	4.85	

*_missing_: nine in the group aged between ≥18 and <60 years; two aged between ≥60 e <80 years; and two aged ≥80 years.**Kruskal-Wallis test.

Most individuals in the three groups had one or two organic insufficiencies, totaling 70% among adults, 77.57% in the older adults, and 73.79% in the very old adults. The analysis of data in Table 2 showed that there was a significant difference (p = 0.01) between the age groups with respect to the number of organic insufficiencies. The result of Kruskal-Wallis multiple comparison test showed that the difference occurred between the groups of adults and older adults (p = 0.01).

According to the results of the LODS, renal insufficiency was most frequent in all age groups, followed by pulmonary insufficiency. Of the 587 patients who had the results of LODS recorded, 409 (69.68%) were affected by renal insufficiency, and this was the only type of organic insufficiency that showed statistically significant difference between the age groups assessed (p = 0.00). The comparison of pairs of groups through the chi-square test showed that the frequency of renal insufficiency in the group of adults differed from the frequency in the groups of older adults and very old adults (p = 0.00).

Tabela 3. Descriptive measures of length of stay at the ICUs and risk of death of patients admitted to those units (No. = 600), according to the SAPS II and LODS, at admission and discharge regarding each age group. São Paulo, 2006-2007.

Variables	Age groups						p*
	Adults (aged ≥18 and <60 years)		Older adults (aged ≥60 and <80 years)		Very old adults (aged ≥80 years)		
	Average (SD)**	Median (Min-Max)	Average (SD)	Median (Min-Max)	Average (SD)	Median (Min-Max)	
Length of stay	8.97 (11.19)	5 (1-79)	8.92 (10.79)	5 (1-71)	8.11 (9.91)	4 (1-42)	0.29
SAPS II admission	15.35 (16.72)	8.80 (.00-93.60)	32.24 (22.23)	26.60 (2.00-95.70)	38.30 (22.46)	34.80 (5.80-88.90)	.00
SAPS II discharge	15.21 (20.83)	6.50 (.00-97.80)	29.67 (25.58)	19.60 (2.00-98.10)	31.77 (21.44)	26.60 (2.90-89.70)	.00
LODS admission	19.20 (17.90)	10.40 (3.20-92.00)	22.42 (18.24)	15 (3.20-88.30)	25.15 (20.77)	15 (3.20-88.30)	.00
LODS discharge	18.74 (20.63)	10.40 (3.20-96.30)	22.60 (22.85)	15 (3.20-98.40)	22.33 (19.43)	15 (3.20-92.00)	.00

*Kruskal-Wallis test; **Standard deviation.

The data of Table 3 show that the increase in the average values of risk of death at admission through the SAPS II and the LODS was progressive, reaching the highest values in the very old adults. There was statistically significant difference between the groups with respect to risk of death according to the SAPS II and the LODS, both at ICUs admission (p = 0.00) and discharge (p = 0.00). The Kruskal-Wallis multiple comparison test showed that this difference in the risk of death through the SAPS II occurred between the groups of adults and older adults (p = 0.00 at admission and discharge), and between the groups of adults and very old adults (p = 0.00 at admission and discharge). Regarding the LODS, the multiple comparison test showed that the difference had also occurred between adults and older adults (p = 0.01 at admission and p = 0.00 at discharge), and adults and very old adults (p = 0.00 at admission and discharge). The length of stay in the ICUs was similar in the three groups assessed.

Statistically significant difference was found between the age groups with respect to mortality (p = 0.03). It was observed that the older adults exhibited greater incidence of death (25.46%) with respect to the adults (15.77%) and very old adults (20%). However, in the comparison of pairs of group, only the

adults differed from the older adults (p = 0.01).

DISCUSSION

As in other studies, the clientele of the present study was predominantly composed of older adults admitted to ICUs.[2-3] In Brazil, the age of the population has been increasing progressively,[6] as well as in other countries.[9] Consequently, the ageing of the population has led to a greater number of hospitalizations of older adults in ICUs. A study conducted in Switzerland confirmed that assumption by analyzing comparatively the characteristics of 35,327 patients hospitalized in ICUs between 1980 and 1995, and showed that the age of the patients had increased significantly during that period.[10]

The assessment of comorbidities, according to the categories of the International Classification of Diseases (ICD-10), showed that those related to diseases of the circulatory system were prevalent in all age groups. This result was similar to that found in a study of characterization of patients in ICUs of the city of São Paulo, which found that the diseases of the circulatory system had affected 70.94% of the patients assessed.[11]

The groups assessed in the present study (adults, older adults, and very old adults) exhibited significant difference with respect to neoplasias; endocrine, nutritional, and metabolic diseases; diseases of the nervous system; and diseases of the circulatory, respiratory, and genitourinary systems. The groups of older adults and very old adults exhibited greater percentages than the group of adults regarding these comorbidities. This fact may be associated with senility and the resulting decline of the functional reserves of organic systems in the aging process that raises the risk of imbalances.[12-13]

The group of very old adults differed from the group of older adults by exhibiting greater frequency of diseases of the circulatory system. Physiological changes—such as increased collagen, valve calcification processes, fat deposit, and failure of the electrical conduction system,[12] among others—in addition to a sedentary lifestyle, suggest an increase in cardiocirculatory insufficiency during aging.[13]

In the present study, most patients had been referred from surgical centers (36.06%) and emergency rooms (35.39%). A study that compared the needs of nursing care and therapeutic interventions carried out in older adult and non-older adult patients admitted to ICUs revealed different results: 40% of the patients had been referred from emergency rooms, 24% from semi-intensive units, and 20% from surgical centers.[2]

The groups assessed in the present study exhibited significant difference between them regarding the origin of referral. In the groups of adults and older adults, the patients referred from surgical centers were prevalent, followed by patients referred from emergency rooms. The inverse occurred with very old adult patients. A study that considered individuals aged over 60 years admitted to ICUs as criterion of inclusion revealed a predominance of patients referred from emergency rooms.[14]

The lowest frequency of very old patients of this study referred from surgical centers can be related to the greatest restriction of surgical indication in this age group in opposition to the other groups (adults and older adults).

The average length of stay in ICUs was 8.9 days. The literature shows variability in the results.[2-3.15] Studies that assessed specifically patients aged over 60 years hospitalized in ICUs showed diversity between the results related to the length of stay in the units: 5.56[16] and 13.9 days.[14]

No significant difference was found between the groups in the assessment of this variable, thus corroborating with a study that assessed patients admitted to ICUs and identified that the length of stay was not related to age groups.[1]

In the present study, the majority of individuals of the three groups had one or two organic insufficiencies identified by the LODS. A study that assessed 1,685 patients who had remained hospitalized in ICUs for more than 48 hours revealed similarity on the first day of hospitalization, with 54% of the total sample being affected by one or two organic insufficiencies.[15]

The comparison between the pairs of groups revealed that the adults differed from the older adults with respect to the number of organic insufficiencies according to the LODS. Studies comparing the number of organic insufficiencies in patients of different age groups hospitalized in ICUs were not found. The professionals working in critical units, especially nurses, have reported that the greater the number of organic insufficiencies that the patients have, the greater their degree of dependence and severity. Such perception reinforces the necessity of conducting further investigations to assess this variable, so that such assumption can be confirmed.

Renal insufficiency was the most frequent in all age groups, affecting about 70% of the cases according to the LODS. This result corroborates with findings of the literature that show prevalence of renal insufficiency[15] and expressive dysfunction of this system in individuals aged over 60 years[16] in ICUs.

The LODS scoring system identifies the presence of renal insufficiency by means of analyzing the urine output and the levels of urea and creatinine,[8] unlike other indexes, such as the Multiple Organ Dysfunction Score (MODS), which uses the concentration of serum creatinine, considering that only this marker is enough to determine the presence of this insufficiency.[17]

In contrast to the MODS, the LODS shows greater sensitivity associated with renal dysfunction, because changes in the urine output—even not associated with abnormalities in laboratory tests—characterize the presence of renal insufficiency in its calculation. This fact may explain the great incidence of that type of insufficiency in the cases assessed (70%), since these changes may be the result of transitory dehydration and responses to surgeries, among other causes.

It was possible to observe that the frequency of renal insufficiency increased progressively in accordance with the age groups, ranging from 57.41% in adults, 78.50% in older adults, and 83.50% in very old adults. A study conducted with 361 adult patients corroborates with this result by revealing that the greater the age, the greater the incidence of acute renal insufficiency.[18] This fact can be explained by the physiological reduction of 10% in renal plasma flow per decade after 50 years of age, in addition to decreased glomerular filtration of 35 to 50% between 20 and 90 years of age, concomitant with the decline of the tubular function. This renal change is enough to meet the organic needs in basal conditions. However, under overload conditions, there is no functional reserve for subsidizing necessary responses for its recovery.[12]

In the present study, the average risk of death of the SAPS II calculated at admission was 15.35% in adults, 32.24% in older adults, and 38.30% in very old adults. As for discharge, the average values of the SAPS II were: 15.21% (adults); 29.67% (older adults); and 31.77% (very old adults). This way, increased age was related to greater severity and risk of death, both at ICUs admission and discharge.

As a result, at ICUs discharge, 73.91% of the older adults and 75% of the very old adults were referred to semi-intensive units, which represent greater percentages compared to those of adults referred to these units (54.89%). These findings suggest the importance of semi-intensive units for continuity of treatment of patients admitted to ICUs, contributing satisfactorily to the turnover and resource optimization in those units. Probably, the greatest percentage of older adult and very old adult patients referred to semi-intensive units—compared to the group of adult patients—is associated with greater severity and the need of greater monitoring of patients aged over 60 years as a consequence of the aging process.

With respect to adult patients, the risk of death calculated by the SAPS II at ICUs admission and the mortality observed had similar values, namely 15.35 and 15.77%. However, the mortality observed in the groups of older adults and very old adults was lower than the mortality predicted by the index: 25.46 and 20%, in contrast to 32.24 and 38.30%, respectively. A different result was found in a study that assessed prognostic indexes in patients aged 60 years or over admitted to ICUs, in which the SAPS II underestimated the lethality.[16]

The average risk of death of LODS calculated at admission was 19.20% in adults, 22.42% in older adults, and 25.15% in very old adults. It is observed that the values of the LODS at admission increased in accordance with the age groups, as well as the SAPS II. A study that assessed 3,536 patients admitted to ICUs and categorized them into three age groups (<40 years, 40-60 years, and >60 years) showed progressive increase of risk of death through the SAPS II in accordance with increasing age. The same result did not occur with the LODS, in which the risk of death was similar in the last age groups.[19]

The analysis of the variables SAPS II and LODS showed statistically significant difference between the age groups with respect to the SAPS II and LODS values at ICUs admission and discharge (difference between adults and older adults, in addition to adults and very old adults). A study which assessed the morbimortality of patients aged over 60 years admitted to ICUs also found that there was no significant difference between the severities in the different groups formed by older adults.[20]

Regarding the analysis of mortality in critical units, the results showed significant difference only between adults and older adults, suggesting that the extremes of age are similar with regard to mortality in ICUs. Corroborating with this finding, a study that

assessed the mortality rate in two groups, case (aged >90 years) and control (aged 20-69 years), found similarities between them.[16]

The findings of the present study show that older adult and very old adult patients exhibited similar clinical characteristics and severity and differed from the younger population. In this context, it is essential to know the characteristics of patients aged over 60 years in order to determine the human and material resources required and planning of care to be provided, since this population is increasing in critical units.

A study showed that it is possible to provide quality nursing care to older adults following the principles of management, training, and research, i.e., pillars of nursing.[21] In this regard, in addition to the need to know the characteristics of the population served, it becomes essential to evaluate the outcomes of the care provided. This can be accomplished by applying indicators of severity that may confront the mortality observed with the mortality expected. This way, possible deficiencies may be identified, thus making it possible to plan and perform processes for improving the quality of the care provided.

CONCLUSION

The results of the present study showed little difference in clinical characteristics between older adult and very old adult patients. The same fact was not observed with respect to adults who, according to the assessment of the variables related to these characteristics, showed significant differences compared with patients aged over 60 years.

The exponential growth of older adult and very old adult patients admitted to ICUs increasingly reinforces the importance of knowing the clinical characteristics of this specific population, which can benefit significantly from intensive care.

In this context, it is essential that nurses become aware of these characteristics which are peculiar to the age of patients cared for in ICUs, so that intensive care planning can be carried out based on the existence of possible clinical and evolutional specificities in different age groups.

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