Predisposing factors for early discharge in elderly patients with hip fracture treated in orthogeriatric units

Factores predisponentes de alta temprana en pacientes ancianos con fractura de cadera tratados en unidades de ortogeriatría

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Abstract

Objective. Analyze the "early discharge" effect (post-surgical hospital stay ≤ 4 days) in patients who underwent hip fracture surgery. *Methodology*. An analytical observational cohort study was conducted, for which patients over 65 years of age with proximal fracture of the femur were analyzed between January 2015 and December 2019, recorded in the database of Hospital Vega Baja (Orihuela). *Results*. 607 cases that met the inclusion criteria, were divided into 2 groups established by hospital stay in days after surgery. The "early discharge" group included 370 cases and the non-early discharge group included 237 cases. Half of the patients were aged > 83 years (50% in the early discharge group and 51.8% in the non-early discharge group). Most of the cases were women (76.5% in the early discharge group and 78.1% in the non-early discharge group). Most cases underwent surgery after 48 hours (57.3% in the early discharge group and 62.9% in the non-early discharge group). *Conclusion*. We found association between lower mortality rates one year after surgery in patients with "early discharge". However, there were no differences in readmission rates in the "early discharge" group versus "no early discharge". And, post-surgery hospital stay (< 6 days) is a protective factor that reduces the probability of hospital readmission.

Keywords: *predisposing factors; hip fracture; elderly; orthogeriatric.*

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Resumen

Objetivo. Analizar el efecto de "alta temprana" (estancia hospitalaria posquirúrgica ≤ 4 días) en pacientes operados de fractura de cadera. *Metodología.* Se realizó un estudio observacional analítico de cohortes, para el cual se analizaron pacientes mayores de 65 años con fractura proximal de fémur entre enero de 2015 y diciembre de 2019, registrados en la base de datos en el Hospital Vega Baja (Orihuela). *Resultados.* 607 casos cumplieron con los criterios de inclusión y se dividieron en 2 grupos establecidos por la estancia hospitalaria en días posteriores a la cirugía. El grupo de "alta temprana" incluyó 370 casos y el grupo de alta no temprana incluyó 237 casos. La mitad de los pacientes tenían una edad > 83 años (50% en el grupo de alta temprana y 51,8% en el grupo de alta no temprana). La mayoría de los casos fueron mujeres (76,5% en el grupo de alta temprana y 78,1% en el grupo de alta no temprana). La mayoría de los casos fueron intervenidos a las 48 horas (57,3% en el grupo de alta precoz y 62,9% en el grupo de alta no precoz). *Conclusión.* Se encontró asociación entre menores tasas de mortalidad al año de poscirugía en pacientes con "alta temprana". Sin embargo, no hubo diferencias en las tasas de reingreso en el grupo de "alta temprana" versus "alta no temprana". Y la estancia hospitalaria posoperatoria (< 6 días) es un factor protector que reduce la probabilidad de reingreso hospitalario.

Palabras clave: *factores predisponentes; fractura de cadera; adulto mayor; ortogeriatría.*

Introduction

Delayed hospital discharge after hip fracture exposes patients to increased postoperative mortality and morbidity rates (1, 2). The improvement in clinical outcomes in patients with hip fracture (HF) has been associated, to a large extent, with the creation of multidisciplinary teams or orthogeriatric units (UOG), which has improved the quality of care in these patients (3). As a measure to analyze clinical outcomes associated with the implementation of UOG, the following have been used in the literature: mean hospital stay, especially at the expense of the decrease in surgical delay (4), and in-hospital mortality rates (5, 6). And, as a measure to analyze the results on the healthcare system, the reduction in healthcare costs has been used.

The variable post-surgical hospital stay is not analyzed as such in the literature. However, some authors suggest an association between hospital readmission and prolonged mean hospital stay, such as Sarimo *et al.* (7), who identify as a risk factor for hospital readmission at 30 days a hospital stay of 3 or more days (adjusted HR 1.231; 95% CI: 1.002-1.513), this is also the case of Pollock *et* *al.* (8), who report as a risk factor for hospital readmission a hospital stay of more than 8 days (OR, 1.5286; 95% CI, 1.223-2.807) or of Heyes *et al.* (9), who detect a higher hospital stay of almost 14 days in patients who were readmitted at 30 days compared to those who were not (OR 3.00, 95% CI 0.115-0.968, p = 0.043). Most previous studies, however, do not differentiate between surgical delay and "early discharge" or reduced post-surgical hospital stay.

Most of the published studies focus their efforts on determining how surgical delay influences HF patients, which has an impact on the mean hospital stay, but only some of them differentiate between surgical delay and post-surgical hospital stay, such as Pablos-Hernández *et al.* (10). In his series, he refers to the decrease in the mean post-surgical hospital stay by 1.2 days (p < 0.001) due to the implementation of a UOG model.

Balvis-Balvis *et al.* (11) publish in 2020 an analysis with the aim of evaluating the influence of UOG on HF patients. They detect a decrease in the mean post-surgical hospital stay of 3.4 days (p < 0.001) and a decrease in mortality during hospital admission in the exposed group (3.6% vs. 10% in the control group, p = 0.004). In addition, it reports total estimated annual economic savings of more than one million euros, thanks to integrated orthogeriatric care. On the contrary, other authors such as Yoo *et al.* (12) detect that a prolonged hospital stay, equal to or less than 10 days, is associated with higher mortality rates one year after surgery (p < 0.05), and prolonged hospital stay in patients with HF may act as a protective factor.

Some authors suggest that hospital discharge or transfer of HF patients after surgery to rehabilitation hospitals or institutions occurs after stabilization of their general conditions, estimated at approximately 4-5 days after surgery (13). The authors of this study have decided to establish as prolonged postoperative hospital stay that which exceeds 4 days from the day of surgery, and "early discharge" as the average postoperative hospital stay equal to or less than 4 days.

Therefore, the objective of this study is to analyze the "early discharge" effect (post-surgical hospital stay ≤ 4 days) in patients who underwent hip fracture surgery.

Methodology

An analytical observational cohort study was conducted, for which patients over 65 years of age with proximal fracture of the femur were analyzed between January 2015 and December 2019, recorded in our database in Hospital Vega Baja (Orihuela). We recorded a total of 607 fractures operated in our center, after excluding pathological, periprostetic and high-energy fractures. Patients were divided according to their hospital stay after surgery into two cohorts:

"early discharge" (considered to be a stay equal to or less than 4 days after surgery) and "no early discharge" (considered to be a stay longer than 4 days after surgery).

Patient-related variables were recorded in both groups, such as: age (was treated as a dichotomized qualitative variable based on the mean age of the sample), sex, concomitant diseases (diabetes mellitus, rheumatic diseases, transplants, history of chronic liver disease, chronic alcoholism), chronic treatment with antithrombotic medication (anticoagulant or platelet antiplatelet), degree of dementia on admission, degree of dependence using the Barthel scale score (14), degree of analytical lymphopenia on admission (values below 1,500/mcl or 1.5 x 109/L were considered as presence of lymphopenia). Variables related to surgery and treatment were also recorded: classification on the ASA scale (15), type of fracture (intracapsular or extracapsular), type of surgical treatment (osteosynthesis or arthroplasty), post-surgery blood transfusion. And the outcome variables were recorded and analyzed: postoperative complications on the surgical wound (defined as a clinical diagnosis of infection with at least one positive aseptic culture of wound exudate), general postoperative complications and the type of complication (alterations in the state of consciousness, pressure ulcers, renal or urinary-related complications, anemia, cardiac complications, respiratory complications, digestive complications, others); mortality at 30 days, mortality at one year and one year after surgery and readmission rates at 30 days, 30-90 days or > 90 days. The cause of readmission was also recorded, differentiating between medical and surgical causes.

Statistical analysis

In the descriptive analysis, the variables will be described by means of absolute and relative frequencies. Comparative tables were drawn up with demographic, patient and fracture data, as well as complications, mortality and readmission data. The statistical analysis of the data was carried out with the SPSS statistical package (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY), establishing an error (α) of 5%, a confidence level of 95% and a p-value of 0.05. The categorical variables with more than two categories, we decided to reduce their dimensions, grouping the categories until "dichotomizing" them: fracture type variable: extracapsular or intracapsular; treatment type variable: osteosynthesis or arthroplasty; ASA variable: ASA I-II or ASA III-IV. Continuous quantitative variables: age and Barthel dependency index score, were dichotomized according to the mean value. In the variable age < 83 years and > 83 years and in the variable Barthel index < 82 or > 82 points.

Results

Of the 607 cases that met the inclusion criteria, they were divided into 2 groups established by hospital stay in days after surgery. The "early discharge" group included 370 cases and the "non-early discharge group" included 237 cases.

The description of the demographic variables is shown in (Table 1).

Half of the patients were aged > 83 years (50% in the early discharge group and 51.8% in the non-early discharge group). Most of the cases were women (76.5% in the early discharge group and 78.1% in the non-early discharge group). A higher proportion of cases with a Barthel scale score above 82 points was observed in the early discharge group (61.1%) compared to the non-early discharge group (49.4%) ($p = 0.005$). The early discharge group had a higher proportion of patients with a history of diabetes mellitus (DM) at admission (33.5%) compared to the non-early discharge group (23.6%) ($p = 0.009$). More than half of the patients presented lymphopenia in

Table 1. Demographic characteristics

Analyzed variable	Early discharge N = 370	%	No early discharge	%	p
Age (> 83 years)	185	50	123	51.8	0.648
Sex (women)	283	76.5	185	78.1	0.653
Barthel (> 82 points)	226	61.1	117	49.4	0.005
DM	124	33.5	56	23.6	0.009
Dementia	71	19.2	52	21.9	0.411
Rheumatological diseases	16	4.3	9	3.8	0.75
Alcoholism	7	1.9	10	4.2	0.09
Liver disease	5	1.4	7	3	0.167
Corticosteroid treatment	12	3.2	4	1.7	0.243
Lymphopenia	215	58.1	156	65.8	0.057

Abbreviations: DM: diabetes mellitus; AG: antiaggregant.

the analytical record at admission (58.1% in the early discharge group and 65.8% in the non-early discharge group). The variables related to fracture and treatment are described in (Table 2).

Table 2. Variables related to fracture and treatment

Analyzed variable	Early discharge N = 370	%	No early discharge N = 237	%	p
ASA I-II/III-IV	119/251	32.2/67.8	49/188	20.7/79.3	0.002
Type of fracture IC/EC	115/255	31.1/68.9	84/153	35.4/64.6	0.264
Treatment OS/ ATP	248/122	67/33	150/87	63.3/36.7	0.345
Post-surgical transfusion	79	21.40	80	33.80	0.001
Surgical delay > 48 hours	212	57.3	149	62.9	0.173

Abbreviations: ASA: American Society of Anesthesiology, IC: intracapsular, EC: extracapsular, OS: osteosynthesis; ATP: arthroplasty.

The majority of patients were ASA III-IV, with the non-early discharge group (79.3%) presenting a higher proportion of ASA III-IV patients compared to the early discharge group (67.8%) (p = 0.002). Extracapsular fracture was the most frequently recorded in both groups and the treatment performed was osteosynthesis. Regarding the need for transfusion, we detected a greater need for transfusion post-surgery in the group of patients not discharged early (33.8%) compared to the early discharge group (21.4%) (p = 0.001). Most cases underwent surgery after 48 hours (57.3% in the early discharge group and 62.9% in the non-early discharge group).

Surgical wound complication

A total of 97 cases of local surgical wound complications were recorded. Most were concentrated in the non-early discharge group. A proportion of 24.6% of seromas or staining of the surgical wound was recorded in the non-early discharge group, compared to 8% in the early discharge group (OR 0.251; 95% CI: 0.158-0.397; p < 0.001). The proportion of cases of superficial surgical wound infection was 2.8% in the non-early discharge group versus 0.6% in the early discharge group (OR 0.19; 95% CI: 0.039-0.923; p = 0.022).

General complications

A total of 219 cases were recorded. Most cases were concentrated in the non-early discharge group. The early discharge group recorded a total of 109 cases (29.5%), compared to 110 cases (46.4%) in the non-early discharge group (OR 0.482; 95% CI 0.343-0.677; $p < 0.001$).

The most frequent general complication in both groups was anemia (15.5% in early discharge and 12.8% in non-early discharge), followed by alterations in the state of consciousness (13.7% in early discharge and 11.4% in non-early discharge).

To detect whether the general or local complication was the consequence of early discharge or, on the contrary, early discharge could be the cause of a lower rate of local and general complications, we reviewed the time in days from surgery to the onset of the complication. We observed that, of the total series, most local complications occurred on the third postoperative day after surgery (62.96%). However, the majority of general complications occurred before the third postoperative day (68.15%).

In the early discharge group, most local and general complications occurred on the second postoperative day (49.20% of local and general complications), while in the non-early discharge group most local and general complications occurred on the third postoperative day (52.6% of local complications and 54.5% of general complications).

Mortality

Mortality was lower in the early discharge group in all subgroups. It was 2.4% in the first 30 days in the early discharge group compared to 5.1% in the non-early discharge group ($p = 0.084$). In the first year after surgery, mortality in the early discharge group was 7.8% compared to 15.6% in the non-early discharge group, this difference being statistically significant ($p = 0.003$). Mortality after one year after surgery was similar in both groups, with a proportion of 14.6% in the early discharge group and 16.5% in the non-early discharge group ($p = 0.535$).

Hospital readmission

A total of 105 cases of hospital readmission were recorded. Of these, 65 (10.7%) occurred in the first 30 days, 30 (4.9%) between 30-90 days and 10 (1.6%) after 90 days.

To analyze the effect of early discharge on the patients, the hospital readmission rate was recorded according to the established time periods (< 30 days, 30-90 days and > 90 days) in the early discharge and non-early discharge groups. A similar proportion was observed in both groups in the first 30 days, 9.5% in the early discharge group and 12.7% in the non-early discharge group ($p = 0.214$). The same occurs between 30-90 days with a proportion of 5.4% in the early discharge group and 4.2% in the non-early discharge group ($p = 0.511$) and in the > 90 days group with a proportion of 1.6% and 1.7% respectively ($p = 0.95$).

The cause of admission was also recorded, distinguishing between readmission for medical reasons (respiratory infection, urinary infection, cardiac problems, etc.) or readmission due to the need for surgery or surgical reasons (surgical wound infection, prosthetic dislocations, failure of the osteosynthesis material due to breakage of the same, cephalic perforation with rotation and collapse in varus due to antero-superior migration of the screw, etc.). There were 91 cases (15%) of readmission for medical reasons and 21 cases (3.5%) of readmission for surgical reasons. The distribution according to cause of readmission was similar in both groups, being for medical reasons in 13.5% in the early discharge group and 17.3% in the non-early discharge group, and for surgical reasons in 3.8% in the early discharge group compared to 3% in the non-early discharge group.

Logistic regression analysis

Predictors of early discharge

To detect which factors independently influence early discharge, we included the factors that were significant in the previous analysis and those that according to the literature could influence early discharge in the logistic regression model (Method = By forward steps [Likelihood Ratio]) and found as independent risk factor for early discharge a score > 82 points (OR 1.461 CI 95%: 1.038-2.056; p = 0.030) and the presence of DM (OR 1.831 95% CI: 1.248-2.686; p = 0.002). And, we found as independent factors that reduce the probability of early discharge to be ASA III-IV (OR 0.476 CI 95%: 0.317-0.716; p < 0.001) and the need for post-surgery transfusion (OR 0.497 CI 95%: 0.339-0.727; p < 0.001).

Predictors of surgical wound complications

To determine whether early discharge is an independent factor for the development of surgical wound complications, we carried out an analysis with the logistic regression model (Method = Forward stepwise [Likelihood Ratio]) including in the analysis the factors that according to the literature could influence higher rates of surgical wound complications and the factors that were found to be significant in the previous analysis.

We found early discharge to be a protective factor for the development of surgical wound complications (OR 0.257 CI 95%: 0.162-0.409; p < 0.001) and the presence of lymphopenia on admission as a risk factor (OR 1.665 CI 95%: 1.019-2.722; p = 0.042).

Predictors of general complications

To determine whether early discharge is an independent factor for the development of general complications, we carried out an analysis with the logistic regression model (Method = Forward stepwise

[Likelihood Ratio]) including in the analysis the factors that according to the literature could influence higher rates of general complications and the factors that were found to be significant in the previous analysis. We found as independent risk factors for the greater development of general complications the history of DM at admission (OR 1.483 CI 95%: 1.018-2.161; p = 0.040) and age > 83 years (OR 2.098 CI 95%: 1.482-2.969; p < 0.001) and as an independent protective factor for the development of general complications, early discharge (OR 0.457 CI 95%: 0.323-0.648; p < 0.001).

Predictors of mortality

To determine whether early discharge is an independent factor for the development of mortality at one year, we carried out an analysis with the logistic regression model (Method = Forward stepwise [Likelihood Ratio]) including in the analysis the factors that according to the literature could influence higher overall complication rates and the factors that were found to be significant in the previous analysis. We found as independent risk factors for a higher mortality rate in the first year to be ASA III-IV (OR 2.062 CI 95%: 1.092-3.895; p = 0.026), age > 83 years (OR 2.589 CI 95%: 1.545-4.337; p < 0.001) and previous history of dementia at admission (OR 1.980 CI 95%: 1.178-3.330; p < 0.001). And we found early discharge (OR 0.472 CI 95%: 0.293-0.758; p = 0.010), as an independent protective factor reducing mortality in the first year after surgery.

Predictors of hospital readmission

We found no differences in the bivariate analysis in the rate of hospital readmission at 30 days, 30-90 days or after 90 days between the early discharge and non-early discharge groups. Given that some articles refer to a higher readmission rate associated with post-surgical hospital stays of more than 6 and 8 days (8), we performed a new bivariate and logistic regression analysis in patients who were readmitted to hospital at 30 days, 30-90 days and > 90 days, including the variable: hospital stay of less than 8 days and hospital stay of less than 6 days, together with the other variables that could influence the readmission rate (Table 3). The dependent variable being the readmission rate: at 30 days, between 30-90 and > 90 days.

After bivariate analysis of patients who were readmitted at 30 days (n = 65), we observed a lower proportion of patients with a Barthel index score > 82 points compared to patients who were not readmitted (control group), a lower proportion of patients with post-surgical hospital stay < 6 days in the 30-day hospital readmission group (75.4%) vs. the control group (87.3%) (p = 0.009) and a lower proportion of cases with post-surgical hospital stay < 8 days (90.8% in the

30-day readmission group vs. 96.1% in the control group, p = 0.048).

Patients with 30-90 days readmission had a lower proportion of women (60%, p = 0.022) and less need for post-surgery blood transfusion (6.7%, p = 0.013).

We did not find any statistically significant difference in the previous analysis in the variables studied in the group of patients with readmission > 90 days.

When we included the factors in the logistic regression model (Method = Forward stepwise [Likelihood Ratio]) to determine independent predictors of hospital readmission at 30 days and 30-90 days we observed that: 1. post-surgery hospital discharge < 6 days (OR 0.447 95% CI 0.241-0.829; p = 0.011) results as an independent protective factor for hospital readmission at 30 days (Table 3). 2. Independent risk factors associated with a higher probability of readmission at 30-90 days are being female (OR 2.497 CI 95%: 1.152-5.412; p = 0.02), the presence of dementia at admission (OR 2.374 CI 95%: 1.057-5.331; p = 0.036) and the need for blood transfusion after surgery (OR 3.623 CI 95%: 1.641-8.001; p = 0.001).

Table 3. Bivariate analysis

Variables introduced in the equation			
	Punctuation	**gl**	**Sig.**
Age < 83 years	.208	1	.648
Sex (F)	.202	1	.653
Barthel > 82 points	8.066	1	.005
Pre-surgical delay < 48 hours	1.861	1	.173
Dementia	.677	1	.411
Anticoagulation and/or antiaggregation	.451	1	.502
DM	6.767	1	.009
ASA III-IV	9.523	1	.002
Arthroplasty treatment	.893	1	.345
Post-surgery transfusion	11.497	1	.001
Global statistics	42.011	10	.000

Abbreviations: F: female; DM: diabetes mellitus: ASA: American Society of Anesthesiology.

Table 4. Independent factors for early discharge

	B	Standard error	Wald	gl	Sig.	Exp(B)	95% C.I for EXP(B)	
							Inferior	Superior
Barthel > 82 points	.379	.174	4.720	1	.030	1.461	1.038	2.056
DM	.605	.196	9.552	1	.002	1.831	1.248	2.686
ASA III-IV	-.742	.208	12.758	1	.000	.476	.317	.716
Post-surgery transfusions	-.700	.195	12.921	1	.000	.497	.399	.727

Abbreviations: DM: diabetes mellitus: ASA: American Society of Anesthesiology.

Discussion

Regarding the relationship between mortality and hospital stay after surgery, Balvis-Balvis *et al.* (11) showed a 6.4% reduction (p = 0.004) in 30-day mortality in patients in whom a reduction in hospital stay was achieved, but the 30-day and 1-year mortality data observed (11) are higher than the data published in our series. This difference could be due to the fact that the mean post-surgery hospital stay in the Balvis group is higher than in our series, being 8.2 days. Lizaur *et al.* (22) show a lower risk of mortality at one year (p = 0.013) in patients with HF who have been treated by shared care units (UOG) which were associated with a significantly shorter mean hospital stay, compared to patients in whom management has been carried out in the classic manner.

Although the results of the Balvis (11) and Lizaur (22) studies are not comparable with our results because they vary in the data on mean hospital stay and post-surgery, the authors seem to find worse results in patients in whom hospital stay is prolonged. In our series we also found such an association, observing an association between lower mortality rate one year after surgery in patients whom early discharge is carried out, that is, in those in whom the hospital stay is reduced to less than or equal to 4 days.

On the other hand, the higher 1-year mortality rate in the group not discharged early could also be due to the presence of a higher proportion of ASA III-IV patients in the group not discharged early, a factor that was an independent risk factor for 1-year mortality, together with early discharge, which was also an independent protective factor that reduced 1-year mortality. Given that factors such as ASA, age or dementia are not modifiable factors during clinical practice, but early discharge can be, the authors of this study believe that it is beneficial to optimize protocols to reduce hospital stay in patients with HF, this being one of the few independent predictors of mortality at one year that can be modified during clinical practice.

Authors such as Basques *et al.* (23) carried out a retrospective study analyzing factors associated with a longer post-surgery stay and a higher rate of hospital readmission in patients who underwent HF surgery, with a mean post-surgery hospital stay of 5.6 days, detecting a 30-day hospital readmission rate of 10%. Kates *et al.* (24), with a mean hospital stay of 4.6 days, recorded a 30-day readmission rate of 11.9%; in addition, this study detected a higher one-year mortality rate in patients who were readmitted versus those who were not readmitted, 52.% versus 21.8%, respectively ($p < 0.001$). Despite the fact that previous studies analyze results in patients whose post-surgery hospital stay is 5.6 days and 4.6 days respectively, and our series analyzes results in patients with a post-surgery stay of 4 days or less, our data regarding the 30-day readmission rate (9.5%) seem to be in agreement with the published data.

In the literature review, we found heterogeneity in the literature as to what mean postoperative length of stay is considered a risk factor for hospital readmission.

In our series, in the statistical analysis, we found no differences between patients with post-surgery hospital stay ≤ 4 days (early discharge) versus > 4 days in terms of readmission rates at 30 days, between 30-90 days and > 90 days. However, when we carried out the analysis of variables that could influence readmission rates, including the variables post-surgery stay ≤ 6 days and post-surgery stay ≤ 8 days, we found among patients readmitted at 30 days a higher proportion of patients with hospital stay > 6 and 8 days. Hospital stay ≤ 6 days being an independent predictor factor associated with lower probability of readmission at 30 days. These data suggest that a "prolonged" hospital stay (understood as > 4 days, > 6 days or > 8 days) may be associated with higher 30-day readmission rates and not the opposite: early discharge is not associated with readmission.

The most frequent causes of readmission in patients with HF are produced by medical problems in a greater proportion than by surgical problems or those related to the surgical wound. Lizaur *et al.* (26)observational cohort study of 732 consecutive patients over 65 years surgically treated for hip fracture and discharged alive in 2010–2014 was conducted. The measurements were patient demographic characteristics, residential and discharge status, Katz Index, Merle D'aubigné Hip Score, Mini-Mental Test, comorbid conditions, Charlson Index, ASA group, type of fracture and repair, and postoperative complications. Patient characteristics were tested by bivariate and multivariate analyses. Results: 8.3% of patients were readmitted within 30 days (56.0% of these within 2 weeks, point out that readmissions for medical causes are thirteen times more frequent than readmissions for non-medical causes.

Thus, in conclusion, based on our results, it seems safe to perform "early discharge" in HF patients in outpatient or home care conditions. And, we observed lower mortality rate one year after surgery associated to "early discharge", without finding a higher rate of hospital readmission due to "incomplete recovery" of patients, neither at 30 days, 30-90 days nor > 90 days after early hospital discharge.

In addition, we observed that there are, on the one hand, risk factors for mortality at one year, not modifiable during clinical practice, such as ASA score, age or dementia. On the other hand, variables such as post-surgery hospital stay or "early discharge", a modifiable protective factor for mortality at one year, can be improved during clinical practice, so it is particularly important to optimize and improve the data on post-surgery hospital stay in patients who undergo HF surgery.

Limitations of the study

Among the limitations, we found those inherent to a retrospective study: the event under study has already occurred and the data collection is based on what was collected in the clinical history. In addition, automated-computerized data are handled in all the variables that were possible. We have found an association between a lower mortality and a lower mortality rate in the first year; however, further studies would be needed to prove the cause-effect between variables.

Conclusion

We found association between lower mortality rates one year after surgery in patients with "early discharge". And we no found differences in readmission rates in the "early discharge" group versus no early discharge. Post-surgery hospital stay < 6 days as a protective factor that reduces the probability of hospital readmission at 30 days.

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