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DELAY IN DISCHARGE TO CONTINUOUS CARE FACILITIES IN HIP FRACTURE PATIENTS



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Mestrado Integrado em Medicina | 2014/2015

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The present work is an original article that has been submitted to *Injury - International Journal of the Care of the Injured* and is pending approval.

During its design and elaboration, both rules of the journal as well as of the University of Porto have been taken into consideration.

Abbreviations

ANOVA - One-way Analysis Of Variance

ASA - American Society of Anesthesiologists

ATR - Admission to Referral

DAMA - Discharged Against Medical Advice

ER - Emergency Room

ERS - Health Regulation Authority report

F - Female

FN - Femoral Neck Fractures

HSA - Hospital de Santo António

LDC - Late Discharge Cost

LOS - Length of Stay

LOSWD - Length of Stay Waiting for Discharge

M - Male

OECD - Organization for Economic Co-operation and Development's

RNCCI - National Network for Integrated Continuous Care

SD - Standard Deviation

TF - Trochanteric Fractures

TS - Time to Surgery in all cases

TS65 - Time to Surgery in cases of patients 65 years or older

DMS - Dynamic Screw-Plate

ABSTRACT

Introduction

Hip fractures are one of the most common types of orthopedic injury and are associated with high rates of morbidity.

Currently, no study has investigated the delay in discharge to Continuous Care facilities in hip fracture patients. The purposes of this paper are to study the delay in discharge to Continuous Care facilities in hip fracture patients; compare the cost of stay in an acute-care hospital versus a Continuous Care Facility; analyze the average time-to-surgery, total length of stay and the number of inpatient deaths and early readmissions.

Methods

The following variables were analyzed: age, gender, ASA classification, inpatient mortality, readmission in a 30-day period after discharge and dates of admission, surgery, referral to the RNCCI and discharge. To gather this information we accessed the charts of the patients who underwent surgery for hip fracture between 2012 and 2013. Variables were compared for statistically significant associations using chi-squared, one-sample t-test, independent samples t-test and ANOVA.

Results

A total of 669 patients underwent surgery for a primary diagnosis of hip fracture; 45.6% of them had surgery within one day.

The analysis revealed a significant association between the referral to the RNCCI with higher age and with less frequent readmissions in a 30-day period after discharge.

The LOS is significantly higher among patients referred to the RNCCI. The LOS means were statistically associated with the ASA classification and with the type of surgery.

Readmission in a 30-day period after discharge is associated with low LOS and higher ages. Inpatient mortality is associated with gender (male) and with the type of surgery performed.

The total late-discharge cost was 797,739€. The overall LOS waiting for discharge represented a bed occupancy of 1% in this hospital. If these patients had been immediately discharged to a Continuous Care facility after referral, the average cost would have been approximately 373,292.3€.

Discussion

Considering the results obtained in this study, efforts must be combined to increase efficiency of discharges without compromising quality of care. The investment in sub-acute settings may contribute to overall reduction of costs in the Health System.

KEY WORDS

Hip Fractures; Continuous Care Facilities; Discharge Planning; Costs and Cost Analysis.

INTRODUCTION

Hip fractures are a major public health concern in terms of morbidity, healthcare costs and mortality.

In 1990, there were 1.26 million hip fractures throughout the world, a figure that is expected to reach 4.5 million in 2050. In treatment costs, about 446.3 billion dollars will be spent by the year 2050.¹⁻⁴

Mortality in the year post hip fracture ranges from 20% to 26% amongst elderly females and males respectively. When compared to patients without hip fracture, mortality is 2 to 4-fold higher in the subsequent year; and is higher for men than for women at any given age.⁵

Although the hip fracture incidence is stabilized in Portugal, the absolute number is expected to continue to rise due to the ageing of the population. The incidence rates for hip fractures are more than twice for women older than 75 years. For both genders the incidence shows an increase with age.⁶

The current evolution in demographics of the more economically developed countries has a great impact in their economy. The new century is going to face the need of more policies to assure the cost-efficiency of the Health Sector without compromising the quality of care.

The average Length of Stay (LOS) in hospitals is often used as an indicator of efficiency.⁷ Nevertheless, too short LOS can reduce the patients' comfort, increase readmission rates and cause adverse effects on health outcomes.⁷

According to the Organization for Economic Co-operation and Development's (OECD) the average LOS for acute-care hospitals in Portugal is 7.5 days, compared to 7.2 in the United Kingdom, 3.5 in Denmark and 5.4 in the United States of America.⁸ Portugal has registered a slightly increase in the LOS considering the previous year's record of 7.2 days.⁸

The time of surgery in hip fractures is crucial. Patients operated within 48 hours seem to have better outcomes with reduced risk of death.⁹ In the OECD report, hip fracture patients who were older than 65 years underwent surgery within 48 hours in 46.6% cases. This number is still one of the lowest when compared to 88.4% in the United Kingdom, 94% in Denmark and 83.2% in Canada.¹⁰

According to the World Bank, the age dependency ratio in Portugal is steadily increasing and is well above the European Countries average.¹¹

In 2006, the Portuguese Government created the National Network for Integrated Continuous Care (RNCCI), which is composed of several units aimed at the reception of patients, regardless of age, that are in a situation of necessity and have low social or family support.

According to the report of the Portuguese Health Regulation Authority (ERS), the public organism responsible for the protection of the access to health care, the number of beds available in the RNCCI is insufficient in 95% of the analyzed areas.¹²

A hip fracture patient faces in the postoperative period numerous challenges. In patients with low social support, in order to continue receiving daily care and proceed with rehabilitation, they must be discharged to RNCCI.

This study aims to analyze the number of days that patients stay at an acute-care hospital waiting for a vacancy at the RNCCI and determine its average cost to the hospital. Additionally, the influence of this prolonged stay in bed occupancy and in overall LOS will be studied. The time-to-surgery period, early readmissions and inpatient mortality will also be investigated in these patients.

METHODS

A retrospective cohort study was completed. Data elements were extracted from charts of patients who had undergone surgery for a primary diagnosis of hip fracture in 2012 and 2013 at a Portuguese acute-care hospital from Porto, Hospital de Santo António (HSA).

After consulting the surgery report we isolated two types of hip fractures: femoral neck fractures and trochanteric fractures; and five types of surgical techniques: Osteosynthesis (DMS), Intramedullary Gamma Nail, Hemiarthroplasty, Total Hip Arthroplasty and Girdlestone Procedure.

Age, gender and the ASA classification were collected from these patients. Furthermore, the dates of admission and surgery and the number of days between these two dates were determined. The number of patients with 65 years and older who underwent surgery in less than 2 days (T65) was determined according to the OCDE report.

The discharge destinations were divided into the following five categories: Ambulatory, RNCCI, Other hospital, Discharged Against Medical Advice (DAMA), Deceased and Not Specified.

Dates of admission, referral to the RNCCI and discharge were noted. The interval between admission and referral to the RNCCI by the physician (ATR) and the number of days each patient had to wait for discharge (Length of Stay Waiting for Discharge, LOSWD) we calculated.

According to the administration of the orthopedics service and the finance department of HSA, the average daily ward expenses were estimated in 177 euros per day during the years 2012 and 2013. The total late discharge cost (LDC) was calculated by multiplying the average daily ward price by the LOSWD.

The total LOS was calculated and compared between patients discharged to the RNCCI and to other destinations. The daily price of stay in the RNCCI, approved legislation by the Portuguese Government, can vary between 105.46 and 60.19 euros according to the type of facility to which the patient is discharged to.^{13, 14} The average value was used (82.83 euros) in order to determine what would have been the cost if patients were immediately discharged after referral.

The total bed occupancy rate by patients waiting for discharge to the RNCCI was calculated by dividing the LOSWD by the total number of beds available at HSA. According to the HSA's Audit Report of 2012 and 2013, this number was 597 and 577 beds, respectively.^{15, 16}

The number and causes of readmissions in a 30-day period after discharge were noted and classified into minor and major conditions. The minor conditions included: superficial wound infections, wound dehiscence, pain referred to the limb, acute decompensation of chronic illness, anemia, falls and urinary tract, respiratory or gastrointestinal infections. The major conditions were the following: deep surgical site infections, sepsis, deep venous thrombosis, acute organ ischemia and death.

In addition to the descriptive analysis, other tests were performed using IBM® SPSS® Statistics 23 including Chi-squared, one-sample and independent samples T-Test and the one-way analysis of variance test (ANOVA). Were considered statistically significant the results with values of $p < 0.05$.

RESULTS

In the years of 2012 and 2013 a total of N=669 cases of hip fractures underwent surgery in HSA.

The average of age was 79.9 years at the time of the fracture (SD of 10.66 years). A total of 23% were male (N=154) and 77% were female (N=515), a proportion of F:M superior to 3:1.

The distribution of the types of fractures observed was the following: 392 cases of trochanteric fractures (TF=58.6%) and 277 cases of femoral neck fractures (FN=41.4%), which can be seen in Fig. 1.

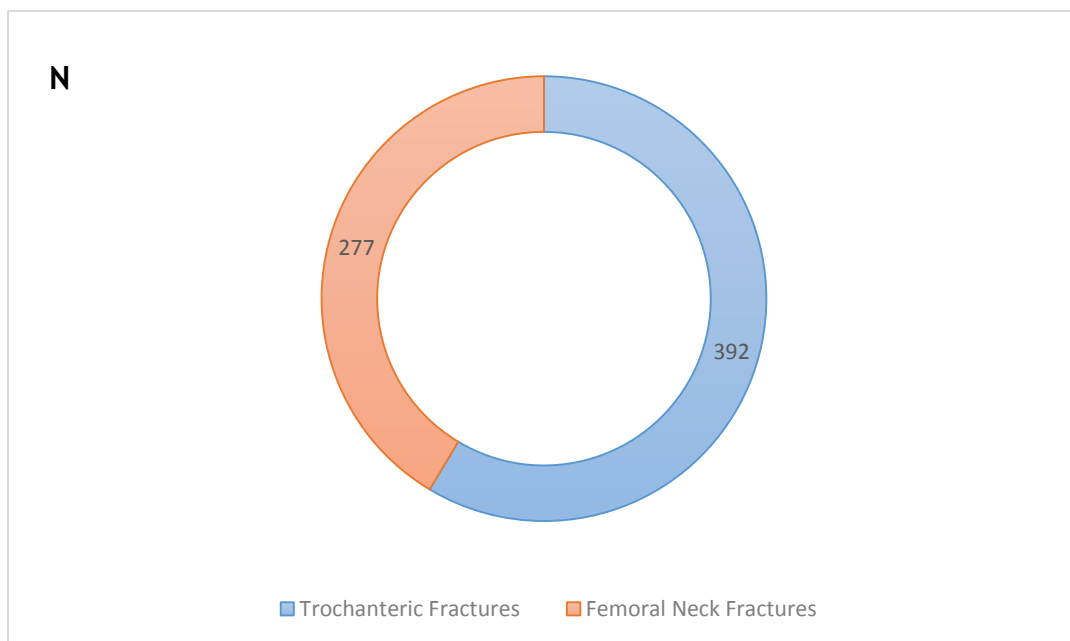


Fig. 1 - Graph showing the Hip Fracture Classification and distribution of the study group.

Regarding the type of surgery, Total Hip Arthroplasties were performed in 43 cases (6.4%), Hemiarthroplasties in 6 cases (0.9%), Osteosynthesis in 459 cases (68.6%), Intramedullary Gamma Nail was used in 159 cases (23.8%) and the Girdlestone Procedure was performed in a total of 2 cases (0.3%). The distribution of surgical procedure by type of fracture and gender can be seen in Table I.

The ASA classification distribution was the following (Fig.2): class I in 9 cases (1.7%), class II in 223 cases (41.6%), class III in 280 cases (52.2%), class IV in 24 cases (4.5%), and both classes V and VI in 0 cases (0%).

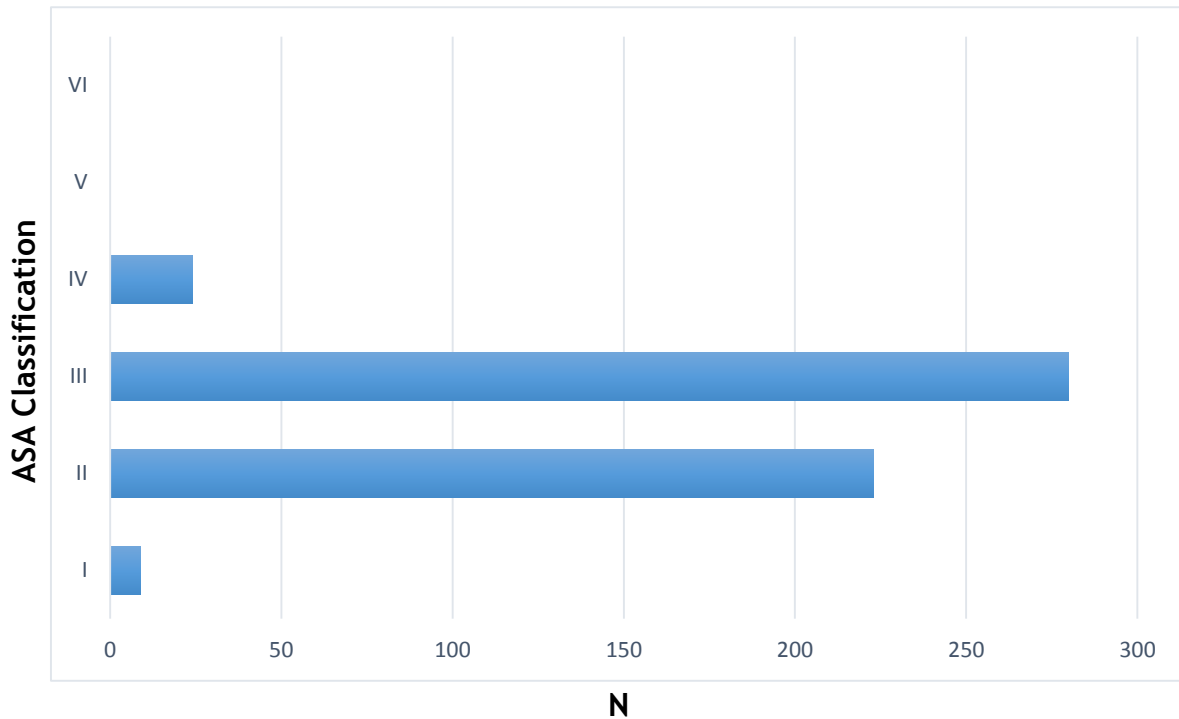


Fig. 2 - Graph showing the distribution of the ASA classification by number of patients observed.

The two more frequent destination discharges (Fig.3) were Ambulatory in 461 cases (68.9%) and to the RNCCI, in 168 cases (25.1%). 8 cases were discharge to Other Hospital (1.2%), 22 deceased during hospitalization (3.3%) and 1 was DAMA (0.1%).

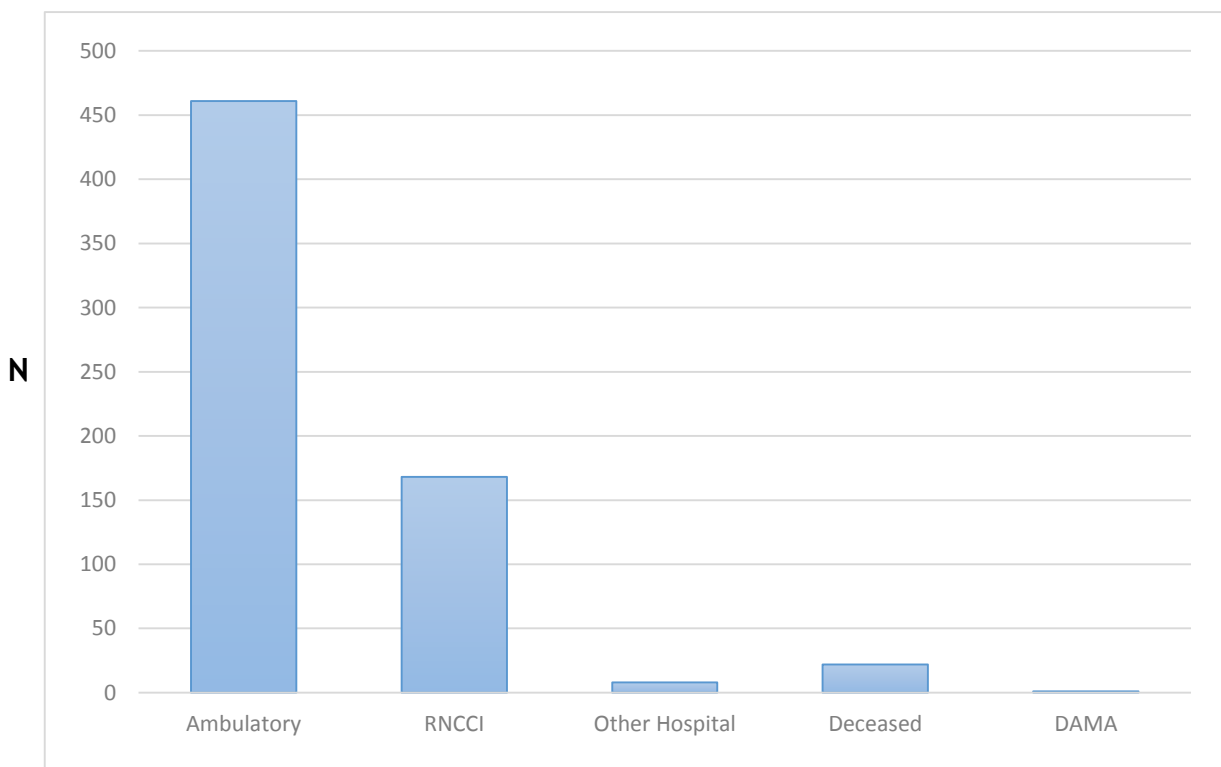


Fig. 3 - Graph showing the distribution of discharge destinations by number of patients observed.

Time between Admission and Surgery

The average time-to-surgery (TS) was 2.1 days (SD 2 days), ranging from a minimum of 0 to a maximum of 30 days in all cases. The observed median was 2 days. Considering only the patients 65 years and older (N=607), the average number of days between hospital admission and surgery was 2.1 days.

The surgery has been done within 2 days in 71.7% of all patients (N=480). In 45.6% of cases (N=305) patients underwent surgery within one day.

Between patients who were 65 years or older, 71 per 100 patients were operated in less than 2 days (N=431).

Patients Referred to the RNCCI

A total of 267 cases were referred to the RNCCI. The average age in this group was 79.9 years, 22% were male and 88% female. The proportion of F:M was approximately 3.5:1.

The average number of days between hospital admission and referral to the RNCCI by the physician (ATR) was 6.8 days (SD 8 days), varying between 0 to 99 days. The observed median was 5 days.

There is evidence that patients referred to the RNCCI are older and have less 30-day after discharge readmissions (Table II). There was no statistically significant association between the referral to the RNCCI and gender, ASA classification, hip fracture class or type of surgical procedure.

Only 62.5% of the patients referred, were discharged to a unit of the RNCCI; 32.2% were discharged to ambulatory and 3.4% have deceased during hospitalization (Table III).

Patients who were discharged to the RNCCI had a mean LOS of 29.8 days (SD 16.8 days), varying from 3 to 149 days; the average age was 82 years (SD 8.6 years) and 23.4% were male (N=39) and 76.6% were female (N=128).

Patients who despite being referred were not discharged to the RNCCI had a mean LOS of 21.3 days (13.3 days), varying from 3 to 60 days; the average age was 80.2 years (SD 11.0 years) and 21% were male (N=21) and 79% were female (N=79).

30-day after Discharge Readmissions

A total of 80 patients were readmitted to HSA in a 30-day period after discharge. Average LOS was 13.8 days (SD 8.5 days).

The average age was 79.9 years, 23.8% were male and 76.3% were female. 43.8% had a diagnosis of Femoral Neck Fracture and 56.3% of Trochanteric Fracture. The surgical procedure distribution in this group was the following: Osteosynthesis in 66.3% of the cases, Intramedullary Gamma Nail in 28.7% and Hemiarthroplasty and Total Hip Replacement in 2.5% each (Table IV).

The major causes of readmission were infections (31.3%) followed by acute decompensation of chronic disease (21.3%) (Table V).

There is evidence that older patients and shorter LOS are associated with an increase in 30-day after discharge readmissions ($p < 0.05$). On the other hand, there is no significant association with ASA classification, type of surgery and hip fracture classification.

Inpatient Mortality

The total inpatient mortality was 21 cases which represents a rate of 3.1% during hospitalization. The average age of the deceased was 81.8 years (SD 2.7 years), varying between 54 and 93 years; 47.6% were male (N=10) and 57% had a diagnosis of trochanteric fracture (N=12) (Table VI) The average LOS between these patients was 19.6 days (SD 16.9 days).

The main causes of death were Pneumonia and other Respiratory Infections with 9 cases (42.9%), followed by Sepsis in 5 cases (23.8%). The other causes of death registered during hospitalization can be seen in Table VII.

Inpatient mortality is significantly associated with the type of surgery. Total hip arthroplasty had a mortality four times higher than expected. ($p < 0.05$). In addition, mortality during hospitalization is approximately three times higher in male patients ($p < 0.05$) (Fig. 4; Table VIII).

There is not statistically significant associations between inpatient mortality and LOS, age, TS, type of fracture or ASA classification ($p > 0.05$).

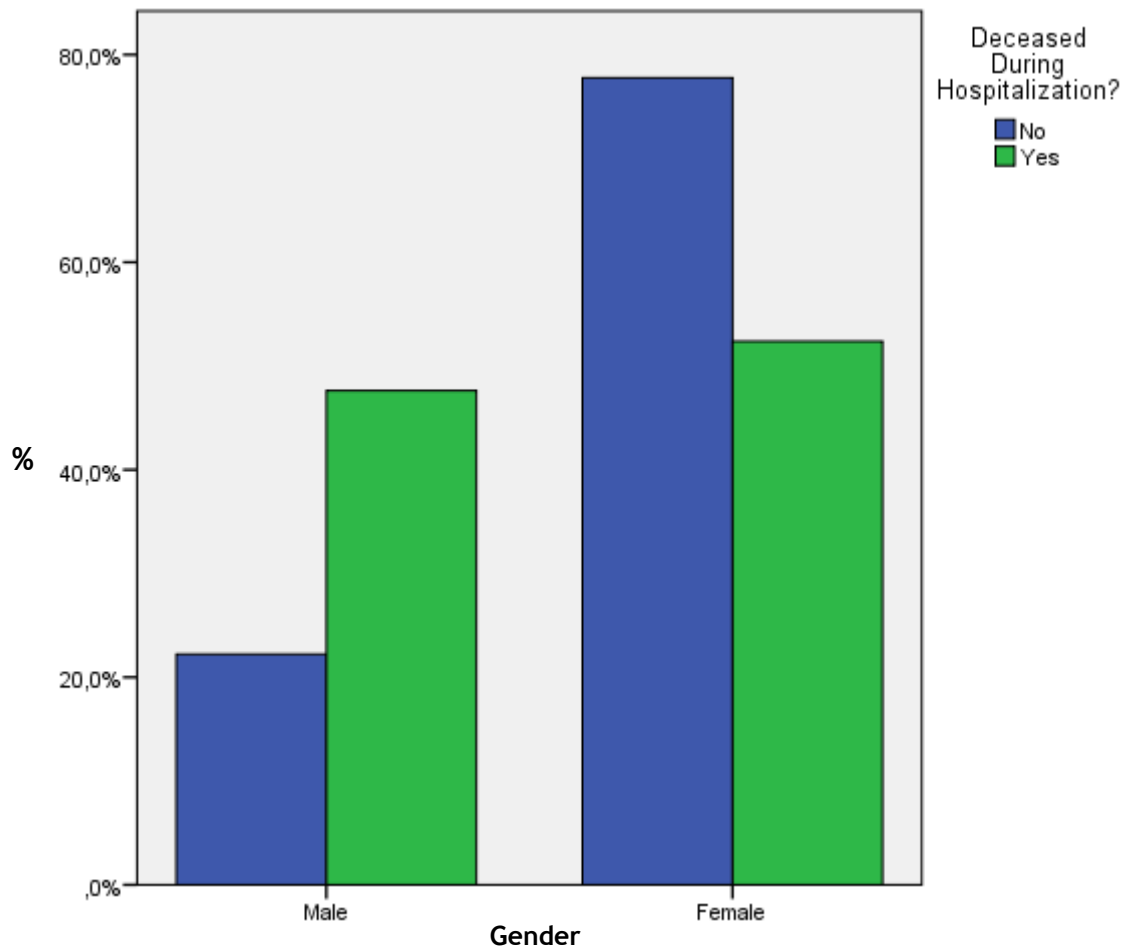


Fig. 4 - Figure shows comparison between Gender and mortality during hospitalization.

Length of Stay and Bed Occupancy Rate

The average LOS was 17.4 days (SD 13.8 days), varying from 2 to 149 days. The observed median was 13 days.

LOS is significantly higher among patients referred to the RNCCI ($p < 0.05$), with an average of 25.4 days (SD 14 days) in contrast with an average of 10.3 days (SD 6.8 days) between those not referred.

Higher ASA classifications had statistically significant association with prolonged LOS (Fig.5; Table IX). Additionally, different types of surgical procedure were associated with statistically significant differences in the means of the LOS ($p < 0.05$) as is demonstrated in Fig. 6 (Table X).

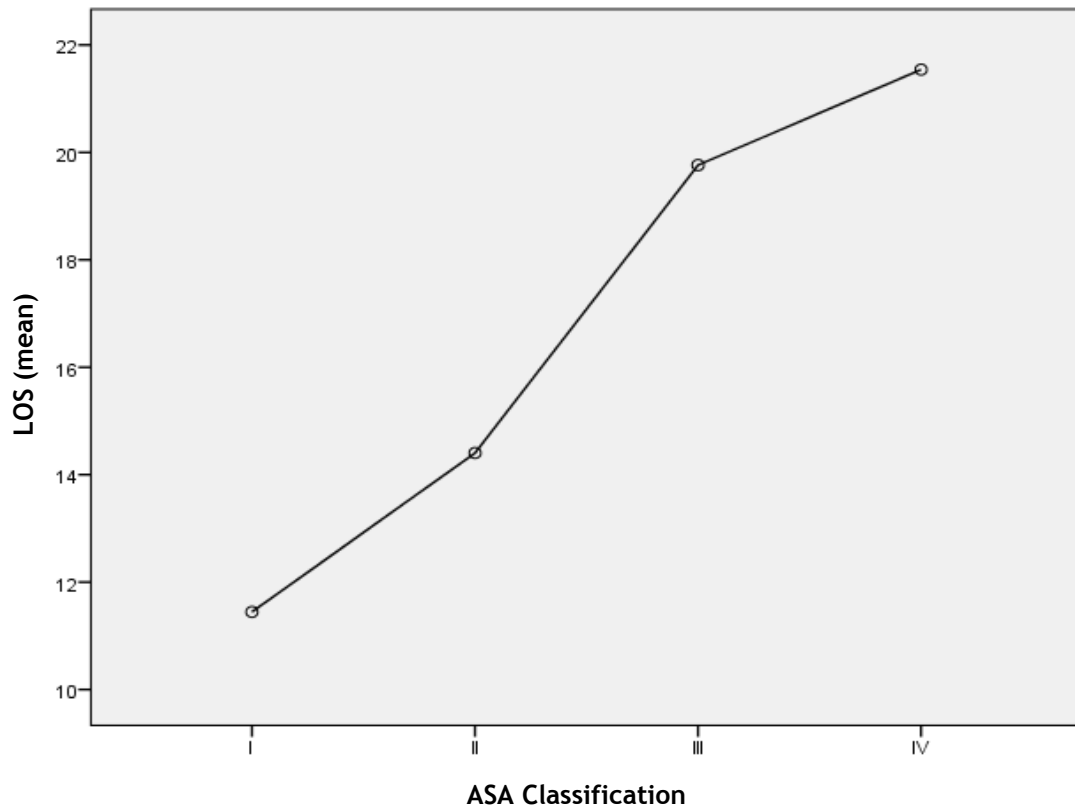


Fig. 5 - Figure shows the LOS mean variation according to ASA classification (I-IV). Since no patients were classified ASA V or VI this was not represented in this graph.

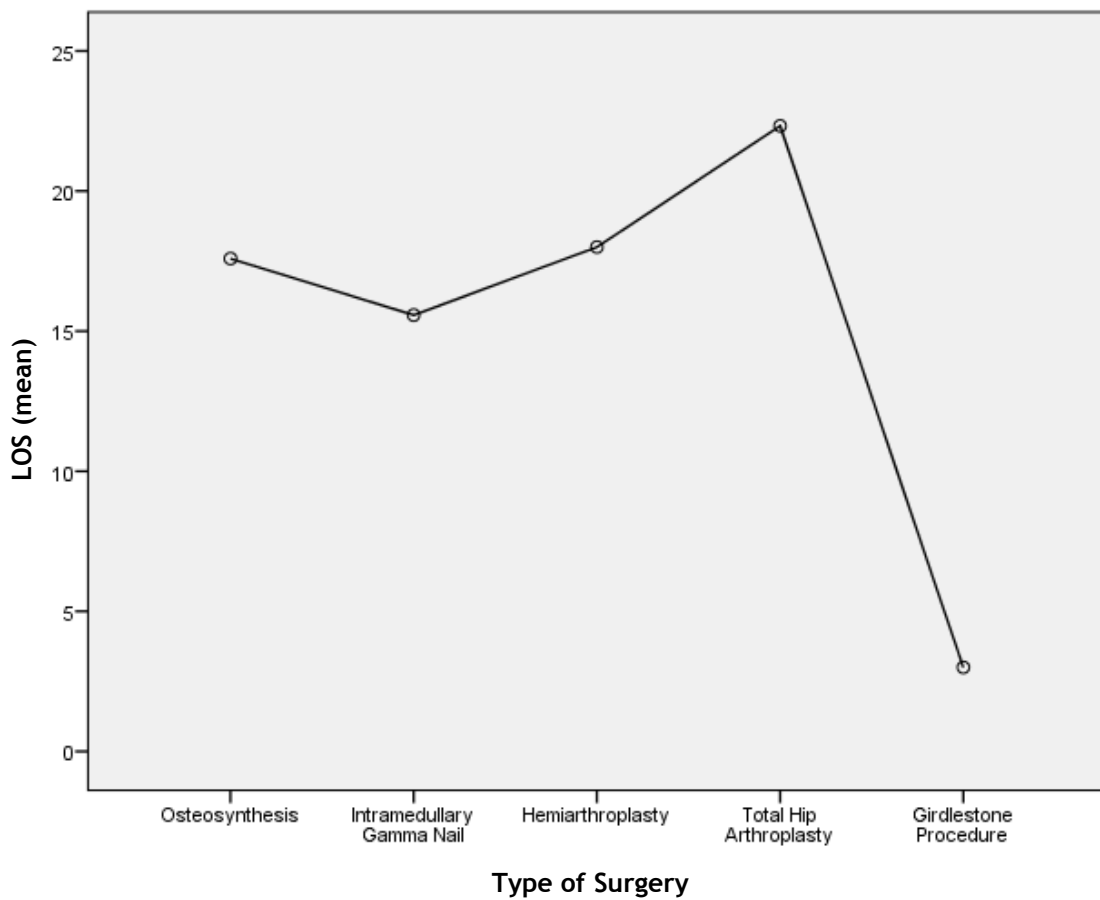


Fig. 6 - Figure shows the LOS mean variation according to the Type of Surgery performed.

No statistically significant associations were found between LOS and gender or hip fracture classification ($p>0.05$).

The total LOS (N=669) and LOSWD (N=267) were 11399 and 4507 days respectively.

The hospital's bed occupancy hip fracture patients during the period of study was 2.7%. Patients waiting for discharge to the RNCCI represented a total bed occupancy of 1.1%.

Evaluation of the Financial Impact

The average LOWD was 17.6 days (SD 12.3 days) varying from 0 to 91 days. The observed median was 15 days.

An average cost of 3,115.2 euros per day between these patients was calculated, considering the daily price (177 euros) of internment according to the Administration of the Orthopedics Service and the Hospital's Finance Department.

The total financial impact of the LOWD (2012 and 2013 combined) was 797,739 euros in this group of patients.

If the patients had been immediately discharged to a unit of the RNCCI the total price for the same group of patients would vary between 475,308.2 and 271,276.3 euros, considering the daily price of 105.46 and 60.19 euros respectively, an average of 373,292.3 euros.^{13, 14}

DISCUSSION

This study analyzed the delay in discharge to continuous care facilities in hip fracture patients that underwent surgical treatment at a Portuguese acute-care hospital between 2012 and 2013.

The average age was 79.9 years, a result that is similar to other studies.¹⁷ The incidence of hip fractures were higher in women than in men, approximately 3 folds superior, which is equivalent to the results observed in other studies.¹⁸

In this study, 71% of the patients aged 65 or older underwent surgery within 2 days. One limitation of our study is that the measure used to access time-to-surgery (days) can overestimate this indicator. Nevertheless, results in our hospital are

significantly superior to the average results in Portugal (46.6%) according to international organizations.¹⁰ Continuous efforts must be done to progressively improve this indicator considering its impact in the risk of death. Delays of more than 48 hours in hip fracture surgery may increase the odds of 30-day all-cause mortality by 41% and of one-year all-cause mortality by 32%.¹⁹ Additionally, rapid surgery after a hip fracture can reduce the incidence of life-threatening complications such as pulmonary embolism.^{20, 21, 22}

The management of a hip fracture patient is challenging, regarding not only the fracture itself, but also the average age and comorbidities that are associated. The information collected during this study allowed to investigate risk factors for increased LOS, inpatient mortality and early readmissions.

The average LOS in our study group was 17.5 days which is identical to other results found in other countries.²³ The group of patients referred to the RNCCI show a significantly higher LOS. This result is explained by the delay in discharge to Continuous Care facilities which increased LOS in nearly 46% in comparison to the average result.

The ASA classification has been previously studied and has shown to be a useful risk-stratification system and a good predictor of long-term mortality in hip fracture patients.^{24, 25} The ASA classification assesses the physical status of patients before surgery by attributing higher scores to patients with more severe comorbidities. Higher ASA grades were associated with increasing LOS, which is in agreement with the results from other papers in this matter.²⁶ This evidence seems logical and can be explained by the increased necessity of medical care in the perioperative period in patients who have more serious comorbidities.

The type of surgery is significantly associated with LOS. Other studies have concluded that total hip arthroplasty and hemiarthroplasty are associated with the longer LOS.²⁷ In this study we isolated intramedullary nailing from other osteosynthesis techniques and have concluded that intramedullary nailing had the shortest LOS. Osteosynthesis slightly longer hospital stay compared to intramedullary gamma nailing has been previously described.^{28, 29, 30}

Inpatient mortality was higher in men and higher than expected for total hip arthroplasties. These evidences are in agreement with previous studies.^{31,32}

Patients referred to the RNCCI have complex health and social circumstances and it is fundamental to assure responses at both levels. These patients have significantly higher ages and lower hospital readmission rates in a 30-day period. This evidence of lower need of acute-care in this period may be related to the daily follow-up by health professionals at continuous care facilities in comparison to patients discharged home.

Surprisingly of those referred to the RNCCI, only 62.5% were successfully discharged to a continuous care facility. This may be due to the difficulty in the access to this type of units considering their recognized deficit.¹² Other possible reasons should be further studied.

Readmissions within 30 days are higher in elder patients which is expectable, but are remarkably lower in longer LOS. Limitations of our study should be noted considering that we only observed the readmissions to our hospital. This evidence suggests a tipping point for LOS reduction and hospital readmissions.³³

The major cause of readmissions in this period were infections (31.3%) which may be related to the risk of infection during prolonged hospitalization. New measures regarding infection prevention and control and monitoring of their correct implementation may improve outcomes, hospitals costs and readmissions.³⁴

After analyzing the total costs of patients waiting for discharge we can easily realize its importance to the hospital and Health System. It is remarkable that our study suggests that our Health System could have saved 50% of the total costs during the LOSWD if patients had been more efficiently discharged to continuous care facilities.

We must note that our study has limitations. The total LOWD cost can be underestimated as we only considered nursing care, hotel, and other basic daily ward expenses. Additionally, we used an average daily price at a continuous care facility to prospect costs, as we did not take into account which was the type of continuous care facility that patients were discharged to.

It is essential that health professionals and administrations from acute-care hospitals, as well as policy-makers, pay close attention to the necessity of assuring efficient discharge plans that reduce costs without reducing the quality of care.

The recovery of hip fracture patients is long and most patients may not regain their prefracture functional status. Other studies are needed to compare outcomes between patients referred to the RNCCI and patients discharged to other facilities.

Understanding and anticipating issues that may arise in the older patient with hip fracture, while delivering evidence-based care components is necessary to maximize patient recovery and the efficiency of our global intervention.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

ACKNOWLEDGMENTS

I would like to thank Prof. Dr. Pedro Cardoso for his support and comprehension during the thesis process.

Likewise, I would like to thank the Administration of the Orthopedics Service and the Social Work Services for their contribution to the elaboration of this thesis.

RESUME (Portuguese version)

Introdução

As fraturas da anca constituem hoje um desafio major em termos de Saúde Pública. Embora estudos recentes mostrem que a incidência das fraturas da anca se encontra estabilizada no nosso país, é expectável que aumente no futuro, considerando o envelhecimento da população e a maior incidência desta patologia em doentes mais idosos. ⁶ A incidência desta patologia é também influenciada pelo género do doente, sendo cerca de duas vezes mais comum em mulheres com mais de 75 anos.

Esta patologia está associada a uma morbilidade e mortalidade elevadas. Estudos prévios demonstraram que, comparando ambos os géneros, a mortalidade varia entre 20 a 26% no final do primeiro ano, no género feminino e masculino respetivamente. ⁵

O intervalo de tempo entre a admissão ao hospital e a cirurgia é fundamental nesta patologia, considerando que atrasos superiores a 48 horas poderão aumentar a

probabilidade de morte em 41% e 32%, no primeiro mês e no primeiro ano, respetivamente. ¹⁹ Adicionalmente, a classificação desenvolvida pela *American Society of Anesthesiologists* (ASA), tem sido comprovada enquanto sistema útil na estratificação do risco e previsão da mortalidade a longo prazo neste tipo de doentes. ^{24,25} Este score permite avaliar o estado físico dos doentes antes da cirurgia, sendo que pontuações mais altas estão associadas a um maior número de comorbidades e a doenças sistémicas mais severas.

Para além do impacto significativo desta patologia na capacidade funcional e na qualidade de vida dos doentes, os custos em saúde associados ao seu tratamento são elevados. Em 2050, preveem-se gastos superiores a 446 mil milhões de dólares em todo o mundo só com o tratamento de fraturas da anca. ¹⁻⁴

O tempo total de internamento tem sido usado por instâncias nacionais e internacionais como indicador da eficiência dos Serviços de Saúde. De acordo com a Organização para a Cooperação Económica e Desenvolvimento (OCDE), o valor médio do tempo de internamento para eventos agudos em Portugal é de 7,5 dias. Este valor apresentou uma subida face ao registado no ano anterior (7,2) e é ainda superior ao de diversos países como Reino Unido (7,2), Dinamarca (3,5) e Estados Unidos da América (5,4). ⁸ Contudo, é fundamental ter em consideração que tempos de internamento demasiado curtos podem aumentar as taxas de readmissão hospitalares e causar efeitos adversos nos resultados. ⁷

A evolução demográfica portuguesa apresenta um grande impacto na economia do nosso país. Durante as próximas décadas, os Serviços de Saúde enfrentarão novos desafios, nomeadamente a premente necessidade de maior eficiência na gestão dos recursos de saúde mas sem comprometer a qualidade assistencial. Adicionalmente, segundo dados do Banco Mundial, o índice de dependência de idosos em Portugal é significativamente superior à média dos países da União Europeia, sendo previsível a manutenção da tendência crescente durante os próximos anos. ¹¹

Em 2006, o Governo Português criou a Rede Nacional de Cuidados Continuados Integrados (RNCCI), composta por várias unidades destinadas à receção de doentes que, independentemente da idade, se encontrem em situação de dependência. Contudo, e de acordo com o relatório publicado em 2013 pela Entidade Reguladora da Saúde (ERS), o número de camas disponíveis na RNCCI é insuficiente em 95% das áreas geográficas estudadas, incluindo o Distrito do Porto. ¹²

O período pós-operatório é de particular dificuldade para os doentes com fratura da anca, dada a elevada taxa de complicações a curto prazo bem como a complexidade inerente à reabilitação funcional. Dado o impacto multifatorial desta patologia nos doentes e nos Serviços de Saúde - e a falta de estudos nesta matéria -, é fundamental avaliar a eficiência da resposta dos cuidados continuados, o tempo de internamento e os custos agravados para o hospital.

Materiais e Métodos

Foram analisados os doentes com diagnóstico primário de fratura da anca entre 2012 e 2013 no Hospital Santo António (HSA), no Porto. As seguintes variáveis foram consultadas a partir dos processos clínicos dos doentes, após aprovação da Comissão de Ética do HSA: idade, género, classificação ASA e datas de admissão, cirurgia, referenciação para a RNCCI e alta. Foram ainda estudadas a mortalidade intra-hospitalar, a taxa de readmissões 30 dias após a alta e o tempo e custo de internamento agravados. Para comparar estatisticamente estas variáveis foram usados os seguintes testes: qui-quadrado, teste t-student e ANOVA com recurso ao *software* IBM® SPSS® Statistics 23.

Resultados e Discussão

A informação recolhida ao longo do presente trabalho permitiu analisar não só o atraso na alta destes doentes para unidades de cuidados continuados, como também o seu custo e a sua repercussão na taxa de ocupação de camas de internamento. Adicionalmente foram estudados os fatores de risco para internamentos mais prolongados, aumento da mortalidade intra-hospitalar e maior número de complicações trinta dias após a alta.

De um total de 669 doentes analisados, sendo que 45,6% dos doentes foram submetidos a cirurgia em menos de um dia. Entre os doentes com 65 ou mais anos, 71% destes foi operado em menos de dois dias. Este valor parece ser significativamente superior aos resultados médios descritos para Portugal por organismos internacionais.¹⁰ Esforços contínuos para prosseguir a melhoria deste indicador são essenciais, considerando a menor mortalidade e a menor incidência de complicações major nos doentes operados mais cedo.^{20,21,22}

O tempo de internamento médio foi de 17,5 dias. A idade média dos doentes analisados foi de 79,9 anos e a incidência da patologia foi cerca de três vezes superior nas mulheres, resultados em concordância com estudos prévios.^{17,18}

O tempo total de internamento foi cerca de 46% superior nos doentes que foram referenciados para a RNCCI, refletindo o impacto direto da demora na transferência destes doentes para unidades de cuidados continuados.

Adicionalmente, tanto a classificação ASA como o tipo de procedimento cirúrgico estiveram associados a diferentes tempos de internamento. Doentes que obtiveram classificações ASA superiores tiveram, em média, tempos de internamento mais longos. Este facto deve-se, provavelmente, à maior necessidade de cuidados médicos por parte dos doentes com patologias mais graves.

A osteossíntese, em contraste com a artroplastia total da anca, foi o procedimento cirúrgico associado a períodos de internamento, em média, menores. Estes resultados são semelhantes a estudos realizados a nível internacional.^{27,28,29,30}

No que à mortalidade intra-hospitalar diz respeito, esta é significativamente superior nos homens, bem como nos doentes submetidos a artroplastia total da anca, evidências previamente descritas em estudos já publicados.^{31,32}

Os doentes referenciados para a RNCCI possuem idades significativamente superiores. Em adição, estes doentes apresentam-se com uma situação clínica complexa, motivada não apenas pela patologia mas também pela retaguarda familiar deficitária - que, nem sempre, possui a disponibilidade necessária para cuidar destes doentes.

Surpreendentemente, entre os 227 doentes referenciados para a RNCCI, apenas 62,5% tiveram alta para uma unidade de cuidados continuados. Este facto poderá ser explicado pela dificuldade de acesso a este tipo de unidades, considerando a deficiência já identificada no número camas por 1000 habitantes, de acordo com o estudo realizado pela Entidade Reguladora da Saúde.¹²

Este estudo demonstrou evidência de uma menor taxa de readmissões hospitalares 30 dias após a alta nos doentes referenciados para a RNCCI. Esta conclusão poderá ser explicada pelo maior acompanhamento por profissionais de saúde nas unidades de cuidados continuados, contribuindo para uma menor incidência de complicações no curto prazo.

As principais causas de readmissão nesse período foram infecciosas (31,3%) as quais deverão estar relacionadas com o risco de infeção associado à hospitalização prolongada. É fundamental uma monitorização da implementação das medidas de prevenção da infeção, dado o seu potencial na melhoria da sobrevida dos doentes e na redução dos custos hospitalares.³⁴

Notavelmente, o número de admissões aumenta significativamente com períodos de internamento menores. Este facto sugere a existência de um período mínimo de internamento abaixo do qual se verificará um aumento do número de complicações a curto prazo.³³

Depois de analisados os custos associados ao período de internamento agravado, compreende-se com facilidade a importância de uma gestão eficiente das altas e de uma resposta rápida por parte da RNCCI. É notável que, de acordo com os resultados do presente estudo, esta maior eficiência na transferência dos doentes para unidades de cuidados continuados poderá representar uma redução de 50% nos custos associados.

Contudo, reconhecemos que o presente estudo apresenta algumas limitações. O tempo entre a admissão e a cirurgia foi calculado em dias, situação que poderá subvalorizar o número de doentes submetidos a cirurgia em menos de 48 horas.

Os custos associados ao período de internamento agravado poderão também estar subestimados, considerando que para o seu cálculo foi usado preço base por dia de internamento. Para a comparação com o custo de internamento na RNCCI por igual período foi usado um valor médio, não tendo sido calculado de acordo com o tipo de unidade da RNCCI para a qual o doente foi transferido.

Dados os resultados do presente estudo, é fundamental que tanto profissionais de saúde, como administradores hospitalares e decisores políticos, estejam conscientes da importância de um planeamento cuidadoso da alta nestes doentes. É fundamental aumentar a eficiência da referência e resposta da RNCCI, numa população com uma dependência crescente, por forma a melhor servir os doentes e a reduzir custos para o hospital e para o Serviço Nacional de Saúde.

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ANNEXES

Table I

Analysis of distribution of the surgical procedure by type of fracture and comparison 30-day readmission, mean Age and LOS.

				Gender		Age	30-day Readmission?		LOS
				M	F	Mean	No	Yes	Mean
				N	N		N	N	
Hip Fracture Class.	Femoral Neck Fracture	Surgical Procedure	OOS	48	181	79	200	25	18
			HA	2	4	86	4	1	15
			THA	10	31	82	31	9	15
			GP	1	1	59	2	0	16
	Trochanteric Fracture	Surgical Procedure	OOS	47	183	81	196	24	17
			GN	46	113	79	132	21	18
			HA	0	0	.	0	0	.
			THA	0	2	81	2	0	16
ASA Score	I			1	8	75	7	2	15
	II			48	175	80	176	34	19
	III			66	214	79	232	41	18
	IV			4	20	81	20	2	18

- a. OOS - Osteosynthesis; HA - Hemiarthroplasty; THA - Total Hip Arthroplasty; GP - Girdlestone Procedure; GN - Intramedullary Gamma Nail.

Table II

Cross-analysis of the 30-day after discharge complications and the patient referral to the RNCCI status (p<0.05)

			30-Day after discharge Complications?		Total
			No	Yes	
Patient referred to the RNCCI?	No	N	327	62	389
		%	57.7%	77.5%	60.1%
	Yes	N	240	18	258
		%	42.3%	22.5%	39.9%
Total		N	567	80	647
		%	100.0%	100.0%	100.0%

Table III

Analysis of the discharge locations frequencies in the group of patients referred to the RNCCI.

Discharged to:	Frequency	Percent	Cumulative Percent
Ambulatory	86	32.2	32.2
RNCCI	167	62.5	94.8
Other Hospital	2	0.7	95.5
Deceased	9	3.4	98.9
Not Specified	2	0.7	99.6
DAMA ^a	1	0.4	100.0
Total	267	100.0	

^aDAMA - Discharged Against Medical Advice

Table IV

Demographic characteristics, Discharge Destination and ASA classification of the patients that experienced complications in a 30-day period after discharge and were admitted to the hospital (N=80).

				Gender	
				M	F
				N	N
Hip Fracture Class.	Femoral Neck Fracture	Type of Surgery ^a	OOS	9	22
			GN	0	0
			HA	0	2
			THA	1	1
			GP	0	0
	Trochanteric Fracture	Type of Surgery	OOS	2	20
			GN	7	16
			HA	0	0
			THA	0	0
			GP	0	0
ASA Class.	I		0	0	
	II		4	13	
	III		7	24	
	IV		1	4	
	V		0	0	
	VI		0	0	
Discharge Destination	Ambulatory		16	50	
	RNCCI		3	7	
	Other Hospital		0	1	
	Deceased		0	0	
	Not Specified		0	3	
	DAMA ^b		0	0	

a. OOS - Osteosynthesis; HA - Hemiarthroplasty; THA - Total Hip Arthroplasty; GP - Girdlestone Procedure; GN - Intramedullary Gamma Nail.

b. DAMA - Discharged Against Medical Advice

Table V

Causes of readmissions in a 30-day period after discharge divided in minor and major conditions (N=80).

		N	%
Minor Conditions	Wound Infeciton	2	2.5%
	Implant Failure	3	3.8%
	Wound Dehiscence	2	2.5%
	Pain	6	7.5%
	Anemia	4	5.0%
	Fall	4	5.0%
	Fractures	2	2.5%
	Infections (Urinary, Respiratory or Gastrointestinal)	25	31.3%
	Other	4	5.0%
Major Conditions	Deep Surgical Infections	3	3.8%
	Acute Decompensation of Chronic Disease	17	21.3%
	SIRS/Sepsis	5	6.3%
	Deep Venous Thrombosis	1	1.3%
	Acute Organ Ischemia	2	2.5%

Table VI

Causes of death during hospitalization in hip fracture patients in the year 2012 and 2013.

Cause of Death	N	%
Multi-Organ Failure	1	4.8%
Sepsis	5	23.8%
Pulmonary Insufficiency	1	4.8%
Pneumonia and Other Respiratory Infections	9	42.9%
Acute Mesenteric Ischemia	1	4.8%
Hospital-acquired Infection (not specified)	1	4.8%
Congestive Heart Failure	1	4.8%
Cardiac Dysrhythmia	1	4.8%
Cardiac Arrest	1	4.8%
Total	21	100.0%

Table VII

Distribution of hip fracture classification, type of surgery and gender between deceased patients during hospitalization.

			Gender		
			Male	Female	
			N	N	
Hip Fracture Classification	Femoral Neck Fracture	Type of Surgical Procedure	Osteosynthesis	2	2
			Intramedullary Gamma Nail	0	0
			Hemiarthroplasty	1	0
			Total Hip Arthroplasty	2	2
			Girdlestone Procedure	0	0
	Trochant. Fracture	Type of Surgical Procedure	Osteosynthesis	5	4
			Intramedullary Gamma Nail	0	3
			Hemiarthroplasty	0	0
			Total Hip Arthroplasty	0	0
			Girdlestone Procedure	0	0

Table VIII

Inpatient mortality and comparison with the variables Gender, Fracture Classification, Type of Surgical Procedure and ASA classification.

		Deceased During Hospitalization?			
		No		Yes	
		N	%	N	%
Gender	Male	144	22.2%	10	47.6%
	Female	504	77.8%	11	52.4%
Frature Classification	Femoral Neck Fracture	268	41.4%	9	42.9%
	Trochanteric Fracture	380	58.6%	12	57.1%
Type of Surgical Procedure	Osteosynthesis	446	68.8%	13	61.9%
	Intramedullary Gamma Nail	156	24.1%	3	14.3%
	Hemiarthroplasty	5	0.8%	1	4.8%
	Total Hip Arthroplasty	39	6.0%	4	19.0%
	Girdlestone Procedure	2	0.3%	0	0.0%
ASA Classification	I	9	1.7%	0	0.0%
	II	221	42.4%	2	13.3%
	III	268	51.4%	12	80.0%
	IV	23	4.4%	1	6.7%
	V	0	0.0%	0	0.0%
	VI	0	0.0%	0	0.0%

Table IX

Comparison of the LOS means between different ASA classifications.

ASA Class.	N	Mean	SD	Minimum	Maximum
I	9	11.44	8.502	5	29
II	223	14.40	9.951	2	51
III	280	19.76	14.122	3	89
IV	24	21.54	20.336	5	105
Total	536	17.47	13.114	2	105

Table X

Comparison of the LOS means between different Surgical Procedures.

Surgical Procedure	N	Mean	SD	Minimum
Osteosynthesis	459	17.59	14.297	149
Intramedullary Gamma Nail	159	15.57	11.213	60
Hemiarthroplasty	6	18.00	10.373	32
Total Hip Arthroplasty	43	22.33	16.212	60
Girdlestone Procedure	2	3.00	0.000	3
Total	669	17.37	13.792	149