



The Importance of Fast-Track Projects for the Outcome of Elderly Patients with Femur and Hip Fractures in the Decrease of all Evaluated Parameters

Luiz Eduardo Imbelloni^{1*}, Douglas M P Teixeira², Umberto Lima³, Thaís Bezerra Ventura⁴, Siddharta Lacerda⁵, Bruno Brasileiro⁶, Micaela Barbosa L Sales⁷, Márcio Duarte⁸ and Geraldo Borges de Morais Filho⁹

¹INCA Senior Researcher, Rio de Janeiro, RJ, Brazil. Anesthesiologist of Complexo Hospitalar Mangabeira, João Pessoa, PB, Brazil

²Orthopedic Surgeon of Complexo Hospitalar Mangabeira Gov. Tarcisio Burity, João Pessoa, PB, Brazil

³Orthopedic Surgeon of Complexo Hospitalar Mangabeira Gov. Tarcisio Burity, João Pessoa, PB, Brazil

⁴Anesthesiologist of Hospital Regional Wenceslaw Lopes, Piancó, PB, Brazil

⁵Anesthesiologist of Hospital da Santa Clara, Campina Grande, PB, Brazil

⁶Anesthesiologist of Hospital Alberto Urquiza Wanderley, João Pessoa, PB, Brazil

⁷Anesthesiology of Hospital Dom Helder, Recife, PE, Brazil

⁸Anesthesiologist of Hospital Polícia Militar General Edson Ramalho, João Pessoa, PB, Brazil

⁹Master in Labour Economics, UFPB, João Pessoa-PB. Statistician of the Complexo Hospitalar Mangabeira, João Pessoa-PB

ABSTRACT

Background: Population aging is a worldwide phenomenon, and there are 37.7 million elderly people in Brazil. In the period between 2008-2012, showed that more than 181 thousand cases occurred, of hip and femur fractures in elderly patients. Through an Excel spreadsheet, designed in 2010, the objective of this study was to compare the results after the implementation of a fast-track project after femoral surgery in patients aged over 60 years, with predicted routine SUS Hospital.

Methods: Patients were observed during two distinct periods: before implantation and after the implementation of the new project. Data evaluation was carried out in four stages of the study in both groups: before arrival to the operating room, during surgery, PACU and on the ward in the morning of day 1 postoperatively. The tests used for statistical analysis were the chi-square test, Fisher's exact test, and the Kruskal-Wallis test. For all tests considered, the significance level is 0.05.

Results: The implementation of the project significantly reduces from 8% to 99% of all parameters evaluated in the four stages of the study and increases the quality of postoperative analgesia by 30%. These data resulted in greater patient and family satisfaction, and probably lower cost.

Conclusions: The Brazilian Public Health System (SUS) project has as its primordial objective the humanization of any medical treatment, and this study decreasing practically all the studied parameters and increasing analgesia (time and quality), should be the objective of the implantation of all SUS hospitals. Despite not having calculated the cost, these results probably contributed to its decrease.

ARTICLE HISTORY

Received June 07, 2023

Accepted June 13, 2023

Published June 19, 2023

KEYWORDS: Elderly Patients, Surgery, Orthopedic, Spinal Anesthesia, Fasting, Perioperative Care, Fast-track Surgery, Postoperative Analgesia.

Introduction

Population aging is a worldwide phenomenon. The World Health Organization (WHO) considers elderly as an individual who is 60 y of age or older, and there are 38 million elderly people in Brazil [1]. There are two ways of classifying aging: the demographic criterion by age group, that is, the old-young group ranging

from 60 to 79 years old, the so-called "third age"; and that of the old man, aged 80 years or more, the "fourth age". The other parameter is individual.

Studies show that in the last 30 years the quality of life of Brazilian elderly people has not only improved, but also healthy longevity has increased [2]. The fourth age entails a level of

Contact Luiz Eduardo Imbelloni, INCA Senior Researcher, Rio de Janeiro, RJ, Brazil. Anesthesiologist of Complexo Hospitalar Mangabeira, João Pessoa, PB, Brazil.

biocultural incompleteness, vulnerability and unpredictability that differentiates it from the third age, which is marked by more positive aspects. Old-old people are at the limit of their functional capacity, which entails restrictions on interventions and social policy. New efforts are needed to deal with the challenges represented by the growing number of old-old people in populations and by the growing prevalence of frailty and psychological mortality, represented by loss of identity, psychological autonomy and sense of control [3].

Although there is still no conclusive data that the maximum lifespan exceeds 120 years, it is clear that fourth age seniors will live longer than those who reached these ages in the past. Adjustments to the health requirements for this group of patients are needed both in medical research and in health policy [4]. We recently published anesthesia in femoral fractures in 112-year-old patients discharged for residency [5]. In a review of the surgical literature, this patient is considered the 2nd oldest anesthetized.

In another article published in 2019, in a prospective longitudinal study in 224 patients over the age of 80 years, with 108 patients between 80-89 years, 80 patients between 90-99 years, and 36 patients with 100 or more years of corrective hip fracture, of both genders, showed the importance of a fast-track project in the elderly [6]. The implementation of the fast-track (ACERTO Project) in fourth age patients of the Brazilian Public Health System (SUS), showed that there was a marked improvement in length of stay, patient satisfaction, decreased use of bladder tube and drains, and referral to ICU, with early discharge to residence [6].

The frail elderly syndrome is a complex condition characterized by the decline of multiple physiological systems, leading to progressive losses of energy reserves, compromising the ability to resist the deleterious effects of chronic stress, moving from a fragile state to hospitalization followed by death, often early [7]. Aging is not a homogeneous fact in the population. While some people reach adulthood in full college, others also suffer in these years from illness and deficits that seriously impair their quality of life. The condition in which we reach old age begins to develop at an early age. In the same way, personality and lifestyle, together with health status, in less than 50 years, are main dictators of the old age state [8]. An imminent consequence in the elderly are outcomes related to mental health, which can be characterized by trauma caused by falls. Between 2012 and 2022, the share of people aged 60 or over jumped from 11.3% to 14.7% of the population, in absolute numbers, the age group went from 22.3 million to 31.2 million, growing 39, 8% in the period [9].

Using a database from the Hospital Information System of the Unified Health System (SIH-SUS), using the Poisson regression model, on femur fractures in the elderly in the period between 2008 to 2012, showed that more than 181 thousand cases occurred. In femur fracture, with a predominance of females, no spatial correlations and temporal differences important [10]. The number of cases of femur fracture in Brazil is high, generating great financial and social costs [10].

The Hospital of SUS did not have an electronic medical record, so the implementation group of fast-track created an Excel spreadsheet (Figure 1) where all procedures for femur fractures in elderly patients were recorded, from 2010.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	
1	GROUP: PRE-PROJECT (Control)																																					
2						Hosp	CHO	Time	Thi	Hun	Sus	Solu	Punc	Posi	Nee	Sens	Mot	Rin	Hidro							Time	Time	PACU	Time	Oral	Plex	Mor	Time	Cath	Confu			
3	Sx	Age	W	H	ASA	Days	Pre	Fast	rst	ger	Surg	LA	tion	ture	tion	dle	Dosis	Level	Block	ger	E.A	Blood	Brad	Hypo	Atro	Vaso	Surg	Spinal	CHO	PACU	Feed	Befo	phi	Block	Blad	sion	PONV	
4																																						
5																																						
6																																						
7																																						
8	GROUP: FAST-TRACK																																					
9						Hosp	CHO	Time	Thi	Hun	Sus	Solu	Punc	Posi	Nee	Sens	Mot	Rin	Hidro							Time	Time	PACU	Time	Oral	Plex	Plex	Time	Cath	Confu			
10	Sx	Age	W	H	ASA	Days	Pre	Fast	rst	ger	Surg	LA	tion	ture	tion	dle	Dosis	Level	Block	ger	E.A	Blood	Brad	Hypo	Atro	Vaso	Surg	Spinal	CHO	PACU	Feed	Befo	After	Block	Blad	sion	PONV	
11																																						

Figure 1: Excel spreadsheet for data collection for fast-track project

The aim of this study was to compare outcomes after project implementation accelerated full recovery after surgery in orthopedics in a hospital with service to public patients over the age of 60 and hip fracture. The primary objective to assess the time hospitalization, the number of suspensions of surgery, length of preoperative fasting and the ability to receive net CHO so complete motor block in the PACU, time to reintroduce oral food compared with the data before implementation. The other objectives were to compare the anesthetic dose, the cephalic dispersion of the anesthesia, the quality of the motor blockade, the incidence of cardiocirculatory alterations, the quality of postoperative analgesia, and the incidence of complications with the data before implementation of the project.

Methods

In July 2010, I moved to João Pessoa to implement some projects at a hospital covered by the Brazilian Public Health System (SUS) in a patient undergoing corrective femur fracture and hip over the age of 60 years. The protocol was registered in Brazil Platform (CAAE: 09061312.1.0000.5179) and approved by the Ethics Research Committee (No. 171,924) and all patients were informed and agreed to participate in the study. During the pre-anesthetic visit the project was explained to the patient and family, and all patients signed an informed consent, and recorded in the Excel spreadsheet previously prepared for the study (Figure 2).

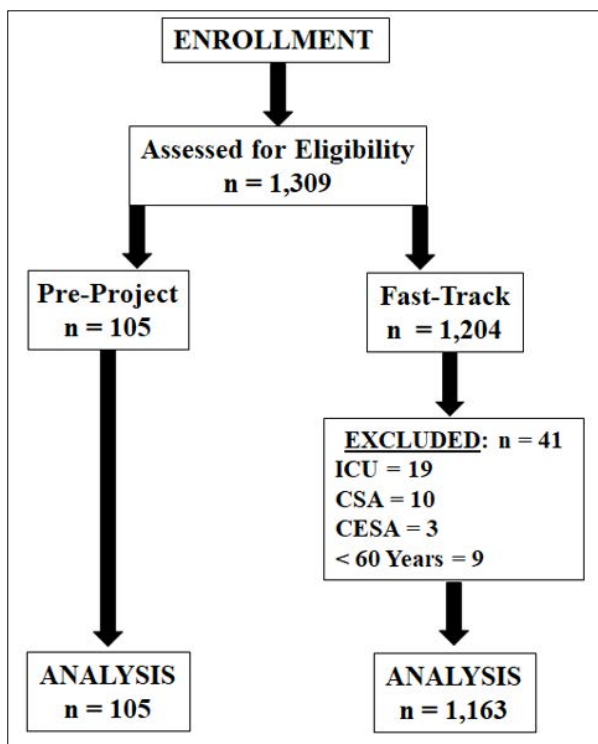


Figure 2: Consort Flow Diagram

ICU: Intensive Care Unit

CSA: Continuous Spinal Anesthesia

CESA: Combined Epidural-Spinal Anesthesia

Inclusion criteria were normal blood volume, no pre-existing neurological disease, no coagulation disorders, without infection at the puncture site, which did not present agitation, mental confusion and/or delirium, which did not make use of bladder indwelling catheters, with hemoglobin level >10g% and that was not in the ICU.

The Hospital SUS did not have magnetic resonance imaging or equipment to perform echocardiography. Thus, the elderly was evaluated jointly by a geriatrician, by the anesthesiologist responsible for the implementation of the fast-track project and by an orthopedist. All orthopedists were trained and at the beginning of the project, and there were residents in orthopedic and anesthesiology.

Project

In both groups, no pre-anesthesia medication was used, either orally or muscularly. Monitoring consisted to EKG, heart rate, noninvasive blood pressure, pulse oximetry, and capnography through the adapter placed in one of the nostrils. After venous cannulation with 18G catheter in the hand or forearm, infusion of Ringer's lactate in parallel with 6% hydroxyethyl starch 130/0.4 in 0.9% sodium chloride injection was started. Administered cefazolin 2 g and dexamethasone 10 mg intravenously. The use of blood was used liberally in the pre-project group and judiciously in the fast-track group.

Cardiorespiratory parameters were measured every 5 minutes. Hypotension (a reduction in SBP > 30% when compared to the pressure in the regular ward) was treated with ethylephrine (2 mg IV), while bradycardia (HR < 45 bpm) was treated with atropine (0.50 mg IV). At the end of surgery, patients received tenoxicam

40 mg and dipyrone 40 mg/kg in 50 mL of Ringer's lactate.

Group Pre Project (Routine Technique)

After sedation with intravenous ketamine (0.1 µg/kg) and midazolam (0.5 or 1 mg), skin cleansing with chlorhexidine or 70% alcohol, spinal puncture was performed with the patient in sitting position or lateral decubitus, through the median interspace from L2 to L5, using a 25G, 26G, 27G Quincke needle or 27G Whitacre needle with introducer. After observing CSF confirming the correct position of the needle, 15 mg of 0.5% isobaric bupivacaine were administered at a rate of 1 mL/15. Associated with the anesthetic local, 100 mg of morphine was administered in the same syringe for postoperative analgesia. Patients were immediately placed in supine position for surgery. The sensorial blockade and motor blockade were evaluated at 15 min after injection. After this period, the patient was placed in the surgical position according to the surgical procedure. Patients included in this group have not received anything by mouth after 24 hours of the previous day.

Group Fast Track (ACERTO Project)

In this group, sedation and spinal anesthesia were used in the same way, with the big difference in the dose of 0.5% isobaric which ranged from 6 to 15 mg, depending on the type of surgery and the surgeon performing the procedure. Patients included in the study received food the day before the operation, 200 mL of maltodextrin 2 to 4 hours before being referred to the Operating Room (OR). The surgeries would be performed until 2 p.m. and they would remain in the post-anesthetic recovery room (PACU) until the end of the block, when they were again given 200 mL of maltodextrin. After 15 to 30 minutes, if the patients accepted oral feeding without nausea or vomiting, they were referred to the ward, without intravenous hydration and with free diet released in the ward. Patients remained with a venous catheter saline for injection of antibiotics, analgesics and or other intravenous medications, and no intravenous serum was prescribed.

The postoperative analgesia was performed through the anterior lumbar plexus block (inguinal) or posterior (psoas compartment) with a neurostimulator. In patients scheduled for the first time, the block was performed before spinal anesthesia in the PACU or room and, in the others, at the end of the surgical procedure in the OR. Blockade was performed with a 50 mm (inguinal) or 100 mm (psoas compartment) needle connected to a peripheral nerve stimulator (HNS 12 Stimuplex®) regulated to release a square pulsatile current of 0.5 mA, with a frequency of 2Hz, seeking to obtain contraction of the quadriceps femoris muscle. Once the desired contraction was achieved, 20 mL of 0.5% enantiomeric excess levobupivacaine + 20mL of 2% lidocaine with epinephrine were injected in the block performed before the operation or 40mL of 0.25% enantiomeric excess levobupivacaine at the end of the operation. The Hospital SUS did not have an ultrasound device for performing peripheral nerve blocks.

Patients in both groups was transferred to the room and received intravenous tenoxicam 20 mg 12/12 hours, dipyrone 1g and cefazolin 1g every 6 hours. The evaluation of data and recording in the Excel spreadsheet was performed at four moments of the study: 1st) Before arrival at the operating room: a) time of hospitalization until the date of the operation, b) number of suspension of the surgery, c) fasting time; 2nd) During the surgical procedure: a) dose of anesthetic used, b) volume

replacement with Ringer's lactate and 6% hydroethyl starch, c) need for blood replacement, d) hypotension arterial blood pressure and correction with ethilephryne, e) bradycardia and correction with atropine, f) surgical time (from venoclysis to the end of the operation); 3rd) In the PACU: a) blocking time (end of motor block), b) food reintroduction time (completion of the operation until oral maltodextrin), c) length of stay in the PACU (completion of the operation until high of the PACU), d) feeding time (end of operation to oral feeding in the ward), e) incidence of nausea and vomiting; 4th) In the ward on the morning of the first postoperative day: a) duration of analgesia provided by the block or morphine, b) food acceptability oral and time for the first meal, c) need of the use of a urinary catheter, d) mental confusion, e) need reintroduction of venous hydration, f) conditions of hospital discharge.

Statistical Analysis

To analyze the association between categorical variables, we used the Chi-Square test and Fisher’s exact test. To analyse the association of interval variables, we used the Kruskal-Wallis test. For all tests considered the significance level is 0.05.

Results

There is no significant difference between the groups regarding demographic characteristics. The data show that 69.1% of patients were female in both groups (Table I). All patients were sedated with intermittent doses of midazolam and ketamine.

Table I: Demographics data (m±SD)

Variables	Pre-Project n = 105	Fast-Track-Acerto n = 1,163	p-Value
Age (ys)	78.72±10.29	78.76±11.11	0.9953 *
Weight (kg)	62.59±12.06	63.24±11.19	0.7066 *
Height (cm)	158.14±9.81	158.43±9.46	0.7754 *
Gender			
Women	67 (63.8%)	810 (69.6%)	0.2255 **
Male	38 (36.2%)	353 (30.4%)	
ASA I/II/III	5 / 86 / 14	61 / 986 / 116	0.5495 ***

* Test Kruskal-Wallis; ** Fisher's Exact Test; *** Chi-Square Test

Using the test of Kruskal-Wallis the average hospital stay until the day of surgery was significantly shorter (p-Value=2.2e-16) after implementation of the project, being on average 15.5 days before the project and 5.94 days after the implementation of the fast-track project (Table II). Similarly using the Kruskal-Wallis test showed there was significant difference (p-Value=2.011e-15) in number of surgery suspension being 45.7% before implantation project and 78.5% of surgical procedures after fast-track project.

Table II: Days of hospitalization before surgery, number of suspensions of surgery, time fasting, incidence of thirst and hunger (m±SD)

Variables	Pre-Project n = 105	Fast-Track-Acerto n = 1,163	p-Value
Hospitalization (d)	15.5±8.05	5.94±2.92	2.2e-16 *
Cancelled surgery			7.548e-15 ***
No cancelled			
Once	48 (45.7%)	913 (78.5%)	
Twice	22	142	
Three	23	72	
Four	10	32	
	2	2	
CHO before surgery	No	Yes	NE
Time fasting (h)	13:30±1:55	2:51±0:31	2.2e-16 *
Thirst (Yes)	80 (76%)	0 (0%)	2.2e-16 **
Hunger (Yes)	94 (89.5%)	38 (3.2%)	2.2e-16 **

* Test Kruskal-Wallis; ** Fisher's Exact Test; *** Chi-Square Test

NE=Not Evaluated

Nine hundred and thirteen patients after implementation of fast-track surgery for femur and hip fractures in elderly patients had no cancellation, compared with 48 patients before implementation of project (Figure 3). All patients in the project fast-track group took 200 ml of CHO between 2 and 4 hours before the procedure, and all patients in the group before project implementation did not take anything by mouth before surgery (Table II). The mean fasting time was significantly shorter after implementation of the project, lowering of 13:30 h to less than mean of 2:51 h in fast-track group (Table II). This reflected that no patient complained of thirst in the fast-track group against 76% of the group nothing by mouth. Likewise, only 3.2% reported hunger in the fast-track group versus 89.5% in the before implementation project group when they reached OR.

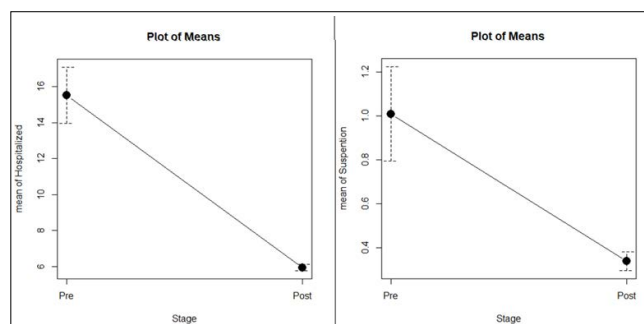


Figure 3: Plot Means of Hospitalization and Suspension of Surgery

All patients were submitted to spinal anesthesia and there was no need of general anesthesia. All pre-implantation all patients received a fixed dose of 15 mg of 0.5% isobaric bupivacaine associated with 100 mg of morphine. In the post implantation group mean was 9.7±1.8 mg of the same drug. In the 15 mg group cephalic dispersion varied between T11 and T7, being the mode T9. Already in the fast-track group received between 6 mg to 15 mg of 0.5% isobaric bupivacaine, cephalic dispersion remained between T12 and T5, with mode T11, with a significant difference (Table III). The difference reflected in a mode of two segments lower (T9 x T11), with significance. All patients in the group pre

project presented full motor block in the lower limbs, while in the fast-track group complete motor block occurred in 1147 patients, and only 16 patients had grade 2 motor block (Table III).

Table III: Spinal anesthesia data in both groups

Variables	Pre-Project n = 105	Fast-Track-Acerto n = 1,163	p-Value	
Dosis bupivacaïne	15.0±0.0	9.7±1.8	2.2e-16 *	
Puncture Level				
L2-L3	32	532	0.0007831 ***	
L3-L4	73	596		
L4-L5	0	35		
Position of Puncture				
Sitting	79	1,044	0.00007108 **	
Lateral decubitus	26	119		
Needle of Puncture				
25G Quincke	49	154	2.2e-16 **	
26G Quincke	24	475		
27G Quincke	22	430		
27G Quincke	10	104		
27G Whitacre				
Cephalic Dispersion			0.00000221 ***	
T12	0	206		
T11	3	307		
T10	19	252		
T9	33	233		
T8	19	117		
T7	15	34		
T6	0	13		
T5	0	1		
Mode	T9	T11		
Motor Block				0.6361 **
BM3	105	1,147		
BM2	0	16		

* Test Kruskal-Wallis; ** Fisher's Exact Test; *** Chi-Square Test

There was a significant difference (p-Value=0.000004046) in relation to the Ringer with Lactate received infusion (Table IV). All patients received 6% hydroxyethyl starch, with significant difference (p-Value=0.0007666) (Table IV). There was not a significant difference (p-Value=0.888) as to the necessity of blood transfusion (Table IV). There was no significant difference in the incidence of bradycardia between the two groups. However, hypotension was significantly lower (p-Value=0.0000001115) with the implementation of the fast-track project (Table IV). All hypotension were easily treated with only one dose of ethylephrine.

Table IV: Volume replacement (Ringer Lactate, 6% hydroxyethyl), blood transfusion, bradycardia, and hypotension

Variables	Pre-Project n = 105	Fast-Track-Acerto n = 1,163	p-Value
Ringer Lactate (ml)	1,068±186	1,201±283	0.000004046 *
Hydroxyethyl 6% (ml)	529±107	508±59	0.0007666 *
Blood transfusion (n)	17 (16.1%)	180 (15.4%)	0.888 **
Bradycardia (n)	0 (0%)	8 (0.6%)	1.00 **
Hypotension (h)	24 (22.8%)	69 (6%)	0.0000001115 **

* Test Kruskal-Wallis; ** Fisher's Exact Test; *** Chi-Square Test

There was a significant difference (p-Value=2.2e-16) in relation to the duration of the surgery (Table V). The duration of the spinal block was significantly longer (p-Value= 6.498e-11) before the implantations of the project (Table V). This reflected in longer time in the PACU. The time for the use of dextrinomaltose in the post-implantation group in the PACU in an average of 1:39 hours (Table V). The moment to reintroduce normal meals was longer in the pre project era. There was a significant difference (p-Value=2.2e-16) in relation to the time of analgesia with the lumbar plexus, comparing with using morphine (Table V).

Table V: Blocking duration, time to feeding CHO in PACU, duration of stay in the PACU, time of oral food reintroduction on the room, and duration of analgesia (m±SD)

Variables	Pre-Project n = 105	Fast-Track-Acerto n = 1,163	P Value
Surgery duration (h)	1:58±0:37	1:53±0:33	2.2e-16 *
Duration spinal (h)	3:13±0:40	2:49±0:35	6.498e-11 *
Time PACU stay (h)	2:19±0:44	2:02±0:44	0.00003843 *
Food room (h)	19:04±2:15	6:19±1:06	2.2e-16 *
Analgesia (h)	16,8±2,6	22±3	2.2e-16 *

* Test Kruskal-Wallis

In the preimplantation time, all patients used a urinary catheter, due to the use of morphine and elderly patients, and all patients were only operated on with a guaranteed place in the ICU. No patient in the fast-track group went to the ICU. In the first PO evaluation, 10 patient (9.5%) presented mental confusion, against 13 (1.1%) of the fast-track group. PONV occurred in 38% of pre-project patients versus 0.1% with fast-track implementation and decreased opioid use. All pre-project patients were only discharged to residency after release from the ICU. All 1,163 patients after the implantation of the fast-track project were ready for discharge in the first post-operative day. As it is a SUS hospital, the discharge for residency depended on the Social Service.

The decrease or increase of all studied parameters were calculated in percentage

(Table VI).

Table VI: Decrease or increase in percentage of studied parameters (mean)

Variables	Pre-Project n = 105	Fast-Track-Acerto n = 1,163	Percentage
Hospitalization (d)	15.0	9.7	↓ 36%
Cancelled surgery	59	250	↓ 76%
Time fasting (h)	13:30	2:51	↓ 81%
Thirst (Yes)	80	0	↓ 99%
Hunger (Yes)	94	38	↓ 96%

Dosis bupivacaine	15	9.7	↓ 35%
Hypotension (h)	24	69	↓ 74%
Duration spinal (h)	3:13	2:49	↓ 20%
Time PACU stay (h)	2:19	2:02	↓ 08%
Food room (h)	19:04	6:19	↓ 67%
PONV	40	2	↓ 99%
Catheter vesical (n)	105	5	↓ 99%
Analgesia (h)	16.8	22	↑ 30%

Discussion

Aging is a concrete fact and a considerable number of elderly patients will undergo different types of surgery. The elderly will benefit from protocols to accelerate their treatment. The implementation of a fast-track project (ACERTO) in elderly patients with femur and hip fractures reduced the time between hospitalization and surgery, the number of surgeries canceled, the preoperative fasting time, the decrease in the dose of 0.5% isobaric bupivacaine, the use of CHO in PACU after the end of spinal anesthesia, the length of stay at PACU, the reintroduction of their meals in the room, the decrease in the ICU stay, the decrease in the use of a urinary catheter, the decrease in mental confusion, the decrease in POVN and the quality of analgesia contributed to the better result of the outcome, when compared with the technique of service routine. The decrease of all parameters studied ranges from 8% to 99%. However, there was a 30% increase in the duration of analgesia with lumbar plexus block. The main objective of the surgical treatment of the elderly is the return to their independent activities, what was achieved in this study. All 1,163 patients were able to be discharged the first morning after surgery, depending on the Social Service of the Hospital.

A single orthopedic surgeon cannot manage all geriatric orthopedic patients. In the study, orthopedists familiar with femur and hip surgeries were selected, facilitating good results. Elderly patients may need geriatric physicians, anesthesiologists, psychologists, nutritionists, physiotherapists, psychologists, nurses, as well as social service personnel [11]. A comprehensive assessment by each specialist is mandatory to obtain a "return to function" or return to independent living. The involvement of many different specialties makes communication ideal, but the correct transfer of information is still critical. To minimize the risk of complications, a complex series of interventions is required, several medical specialties and hospital services need to be coordinated, and time is an important factor in successful treatment [11]. Unfortunately, this level of coordination seems difficult to achieve. In the implementation of this fast-track project in elderly orthopedic patients, was coordinated by anesthesiologist. And later, with the results obtained in the outcomes, other anesthesiologists headed this coordination.

The project was implemented in elderly patients, over 60 years old with femur fractures, so in the pre-anesthetic interview at admission, in the presence of family members, all received detailed information explaining the project, to reduce everyone's

anxiety. In a previous study, during this interview, the most important question for family members was whether the surgery would be postponed [12]. It is known that when preparing for surgery, the patient and family bring with them many expectations and doubts regarding what will happen. All their concerns their surgery and fear of its cancellation [13,14]. In University Hospital dedicated to secondary care, the cancellation rate was 19.9% [13]. In this study, with the implementation of the fast-track project, the incidence of suspension dropped significantly from 54.3% to 21.5%. The number of canceled surgeries has drastically reduced.

The optimization of the perioperative components of individual care result in economy or cost reduction [11]. The application of projects with improvement of the treatment during the perioperative period reduced the time of hospitalization after total hip and knee arthroplasty, with a 3-day stay in different departments [15]. The implementation of this project in a SUS Hospital reduced the length of stay from 15.50 days to 5.94 days, a drop of 62%, resulting in cost savings.

The different preoperative fasting guidelines of the most Societies of Anesthesiologists recommend a fasting time from clear liquids of 2 hours and 6 hours for a light meal diet. Unfortunately, many anesthesiologists still require nothing by mouth for more than 8 hours. The implementation of the project reduced the average fasting time from 13:30 hours to just 2:51 hours, with no case of bronchoaspiration in elderly patients. Reducing the fasting time lessened the sensation of thirst and hunger at the entrance to the operating room. The incidence of thirst dropped from 76% to 0%, and of hunger from 89.5% to 3.2%, increasing patient satisfaction. Results similar to another study of patient satisfaction with shortening fasting [16].

The routine of the anesthesiology department in the pre-implantation period of patients undergoing spinal anesthesia in patients with femur fractures, was the use of a fixed dose of 15 mg of 0.5% isobaric bupivacaine. The knowledge of the orthopedic team of only experienced professionals was very important for the decision to reduce the total dose of isobaric 0.5% bupivacaine, and depending on the type of osteosynthesis to be used. The reduction was from 15 mg of 0.5% isobaric bupivacaine to an average of 9.7 mg of the same substance, providing a lower incidence of hypotension, lower block duration, shorter PACU stay. In the fast-track design, during spinal anesthesia, colloid (6% hydroxyethyl starch + sodium chloride) was used in all patients during surgery and may have influenced the reduced incidence of hypotension compared to the pre-design and common group. The incidence of arterial hypotension was 22.8% with 15 mg, reducing to 6% with the new doses of 6 and 15 mg of 0.5% isobaric bupivacaine. There was no difference in the incidence of bradycardia in the two groups. The dose of 15 mg of 0.5% isobaric bupivacaine provided a mean time of block of 3:13 hours. The reduction of the average dose of 9.7 mg of the same solution decreased this mean time to 2:49 h, a reduction of 21% in the blocking time, 8% of the time spent in the PACU.

Patients under spinal anesthesia with hyperbaric 0.5% bupivacaine solution combined with 200 µg intrathecal morphine had a higher incidence of urinary catheterization, longer time to urinate and longer time to urinate compared to patients receiving only local anesthetics [17]. A recent meta-analysis showed that urinary

catheterization during total knee arthroplasty may increase postoperative urinary tract infection, and routine use may not be necessary in these patients [18]. Routine preoperative bladder catheterization may not be warranted in patients with total hip arthroplasties, increasing the incidence of prosthesis infection [19]. In the pre-project group, morphine and urinary catheter were used in all patients, as part of the service's routine. In the fast-track project, neither morphine nor a urinary catheter was used, and the postoperative need was evaluated, which occurred in only 5 patients. This study showed that it is possible to avoid probing the bladder in elderly patients undergoing orthopedic surgery of the femur and hip.

Delirium is the most common postoperative neurological complication in patients over 60 years of age and is associated with increased morbidity and mortality [20]. Its multifactorial cause and the obscure pathophysiology of delirium have made it difficult to prevent and treat. Pain, use of opioids, inflammation response to injury, stay in ICU, are likely risk factors for delirium in surgical patients [20]. Probably the anesthetic technique in the pre-project group has contributed to mental confusion in 10 (9.5%) patients, compared with the fast-track technique which fell to 13 (1.1%) patients.

Ketamine is an intravenous anesthetic and in subanesthetic doses it reduces postoperative markers of inflammation as well as postoperative pain and opioid consumption [21]. In addition to being excellent for reducing lumbar puncture pain for spinal anesthesia [22]. In patients undergoing cardiac surgery intraoperative subanesthetic dose of ketamine was associated with a reduction in the incidence of postoperative delirium from 31% to 3%, with no apparent negative effect [23]. Ketamine in a systematic review decreased delirium in children, and clinical evidence suggests that it has neuroprotective properties [24]. The use of ketamine probably contributed to the reduction of mental confusion in the elderly in this study.

Improving adherence requires a continuous and dynamic process. A strong commitment to a multidisciplinary team an approach is needed to move forward in this area, requiring coordinated action by health professionals, researchers, health planners and policy makers. This multidisciplinary approach requires further refinement of its individual components to provide the ultimate goal, and it is not a simple task to implement a new protocol for the surgical patient. It needs a lot of determination, widespread acceptance and goals compatible with common practice, concrete definitions of the desired parameters and a format that is easy to access and use. A study in Brazil showed that the adherence of the various services collaborated with the results obtained [11]. However, there are some specialties that tend not to adhere to the fast-track protocol. Median overall adherence to ERAS program in colorectal surgery items was 71.4% [25].

In a recent meta-analysis, it was revealed that the use of fast-track in hip orthopedic surgery shortened the length of stay, pain relief, complications, leaving the bed, costs, and nursing satisfaction [26]. In a recent study showing the results of the implementation of multimodal perioperative care protocols such as the ACERTO project in surgical patients, it was shown that it resulted in lower morbidity and mortality [27].

Conclusion

In conclusion, the use of clinical strategies, the collaboration of the various hospital services, reduced the length of stay before surgery, the number of surgery cancellations, fasting time, duration of surgery, dose decrease 0.5% isobaric bupivacaine, length of stay in PACU, time of reintroduction of oral food, non-use of urinary catheter, decrease in PONV, and the early discharge of elderly patients with femur and hip fractures. The increase in time and quality of analgesia was responsible for the use of peripheral block compared with spinal morphine. The earlier return to family life is the application of a humanized treatment with increased patient and family satisfaction. The Brazilian Public Health System (SUS) project has as its primordial objective the humanization of any medical treatment, and this study decreasing practically all the studied parameters and increasing analgesia (time and quality), should be the objective of the implantation of all SUS hospitals. Although the costs were not evaluated, the decrease from 8% to 99% of all evaluated parameters, we can insert that there was a decrease in costs.

Key Points

- **Question:** As one of the leading causes of elderly patients' hospitalization, femur and hip fractures, will present an increasing socioeconomic problem in the near future. Fast-track design should be performed in these patients to avoid complications and decrease mortality rates
- **Findings:** In all parameters used in the implementation of the project (ACERTO) there was a decrease from 8% to 99% of these parameters. In the quality and duration of analgesia by lumbar plexus block, it provided a 30% increase when compared to intrathecal morphine.
- **Meaning:** All conducts used in the study increased better results, patient and family comfort and satisfaction with the anesthetic care used in this study.

References

- [1] Brazilian Institute of Geography and Statistics – IBGE; (2022) Agência Brasil - Brasília. Available from: <https://www.ibge.gov.br/en/home-eng.html>.
- [2] Camarano AA (2013) The new demographic paradigm. *Cien Saude Colet* 18: 3446.
- [3] Baltes P, Smith J (2006) New frontiers for the future of aging: from the successful old age of the young elderly to the dilemmas of the fourth age. *The Third Age (Sesc-SP)* 17: 7-31.
- [4] Greengross S, Murphy E, Quam L, Rochon P, Smith R (1997) Aging: a subject that must be at the top of world agendas. *BMJ* 315: 1029-1030.
- [5] Imbelloni LE, Lima U, Lacerda S, Madruga J (2016) Surgery for a fractured femur at 112 years of age. *Case Report. World J Pharm Pharm Sci* 5: 293-299.
- [6] Calvin L Cole, Kostantinos Vasalos, Gregg Nicandri, Cameron Apt, Emmalyn Osterling et al. (2019) Are we ready for hip fracture geriatric patients? Study with 224 patients of the fourth age. *Orthop & Spo Med Op Acc J* 3: 247-254.
- [7] García FJG, Zugasti JLL, Mañas LR (2011) Frailty: A phenotype under review. *Gac Sanit* 25: 51-58.

Citation: Luiz Eduardo Imbelloni, Douglas M P Teixeira, Umberto Lima, Thaís Bezerra Ventura, Siddharta Lacerda, et al. (2023) The Importance of Fast-Track Projects for the Outcome of Elderly Patients with Femur and Hip Fractures in the Decrease of all Evaluated Parameters. Progress in Orthopedic Science. POS-141.

- [8] Vaillant GE, Mukamal K (2001) Successful aging. *Am J Psychiatry* 158: 839-847.
- [9] IBGE: with 14.7% of elderly people, the Brazilian population is older. Accessed on May 12, 2023. <https://www.em.com.br>
- Soares DS, Mello LM, Silva AS, Martines EZ, Nunes AA (2014) Femoral fractures in elderly Brazilians: a spatial and temporal analysis from 2008 to 2012. *Cad Saúde Pública* 30: 2669-2678.
- [10] Imbelloni LE, de Moraes Filho GB (2016) Attitudes, awareness, and barriers regarding evidence-based orthopedic surgery between health professionals from a Brazilian Public Health System (SUS) hospital: Study of 400 patients. *Anesth Essays Res* 10: 546-551.
- [11] Imbelloni LE, Gomes D, Braga RL, Moraes Filho GB, Silva A (2014) Clinical strategies to accelerate recovery after surgery orthopedic femur in elderly patients. *Anesth Essays Res* 8: 156-161.
- [12] Perroca MG, Jericó MC, Facundin SD (2007) Monitoring cancellations of surgical procedures: An indicator of organizational performance. *Rev Esc Enferm USP* 41: 113-119.
- [13] Pascoal MLH, Gatto MAF (2006) Cancellation rate of surgery in a university hospital and the reasons for absenteeism patient scheduled for surgery. *Rev Lat Am Enfermagem* 14: 48-53.
- [14] Kehlet H, Søballe K (2010) Fast-track hip and knee replacement. What are the issues? *Acta Orthop* 81: 271-272.
- [15] Imbelloni LE, Pombo IAN, Moraes Filho GB (2015) The decrease in fasting time improves comfort and satisfaction with anesthesia in elderly patients with hip fracture. *Rev Bras Anesthesiol* 65: 117-123.
- [16] Tomaszewski D, Bałkota M, Truszczyński A, Machowicz A (2014) Intrathecal morphine increases the incidence of urinary retention in orthopaedic patients under spinal anaesthesia. *Anaesthesiology Intensive Therapy* 46: 29-33.
- [17] Ma Y, Lu X (2019) Indwelling catheter can increase postoperative urinary tract infection and may not be required in total joint arthroplasty: a meta-analysis of randomized controlled trial. *BMC Musculoskeletal Disorders* 20: 11. DOI: 10.1186/s12891-018-2395-x.
- [18] Iorio R, Whang W, Healy WL, Patch DA (2005) The utility of bladder catheterization in total hip arthroplasty. *Clinical Orthopaedics and Related Research* 432: 148-152.
- [19] Inouye SK, Westendorp RG, Saczynski JS (2014) Delirium in elderly people. *Lancet* 383: 911-922.
- [20] Dale O, Somogyi AA, Li Y, Sullivan T, Shavit Y (2012) Does intraoperative ketamine attenuate inflammatory reactivity following surgery? A systematic review and meta-analysis. *Anesth Analg* 115: 934-943.
- [21] Imbelloni LE, de Moraes Filho GB (2015) Comparison of effectiveness of four subanesthetic doses of dextroketamine in allaying procedural discomfort during spinal anesthesia: A randomized double-blind trial. *SOJ Anesthesiol Pain Manag* 2: 1-5.
- [22] Hudetz JA, Patterson KM, Iqbal Z, Gandhi SD, Byrne AJ, et al. (2009) Ketamine attenuates delirium after cardiac surgery with cardiopulmonary bypass. *J Cardiothorac Vasc Anesth* 23: 651-657.
- [23] Costi D, Cyna AM, Ahmed S, Stephens K, Strickland P, et al. (2014) Effects of sevoflurane versus other general anaesthesia on emergence agitation in children. *Cochrane Database Syst Rev* 9: CD007084.
- [24] Catarci M, Ruffo G, Viola MG, Felice Pirozzi, Paolo Delrio, et al. (2022) ERAS program adherence-institutionalization, major morbidity and anastomotic leakage after elective colorectal surgery: the iCra2 multicenter prospective study. *Surgical Endoscopy* 36: 3965-3984.
- [25] Jiang M, Liu S, Deng H, Liang X, Bo Z (2021) The efficacy and safety of fast track surgery (FTS) in patients after hip fracture surgery: a meta-analysis. *Journal of Orthopaedic Surgery and Research* 16: 1621-34.
- [26] Aguilar-Nascimento JE, Salomão AB, Caporossi C, Diana Borges Dock-Nascimento, Pedro Eder Portari-Filho, et al. (2020) ACERTO Project - 15 years changing perioperative care in Brazil. *Rev Col Bras Cir* 48:e20202832.