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Original Article

Why do patients undergoing anterior cruciate ligament reconstruction in Brazil stay in hospital for longer periods than in other countries? Prospective evaluation of 30 patients and presentation of possible discharge criteria★

Diego Costa Astur,[a,] Pedro Gabriel Riboli Navarro,[b] Lucas Furtado Fonseca,[b] Gustavo Gonçalves Arliani,[a] Vinicius Aleluia,[c] Ciro Veronese,[c] Camila Cohen Kaleka,[d] and Moisés Cohen[e]*

[a]*Orthopedist at the Sports Traumatology Center, Department of Orthopedics and Traumatology, Escola Paulista de Medicina, Universidade Federal de São Paulo, São Paulo, SP, Brazil*
[b]*Resident Physician in the Department of Orthopedics and Traumatology, Escola Paulista de Medicina, Universidade Federal de São Paulo, São Paulo, SP, Brazil*
[c]*Orthopedist at Instituto Cohen, São Paulo, SP, Brazil*
[d]*Orthopedist at the School of Medical Sciences, Santa Casa de Misericórdia de São Paulo, São Paulo, SP, Brazil*
[e]*Full Professor and Head of the Department of Orthopedics and Traumatology, Escola Paulista de Medicina, Universidade Federal de São Paulo, São Paulo, SP, Brazil*

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ABSTRACT

Objective: Evaluate a better moment by the medical team and patient to be discharged and relate to possible medical discharge criteria. *Methods:* 31 anterior cruciate ligament reconstructed patients under similar conditions prospectively evaluated about the possibility of discharge with 24 and 48 hours after surgery and possibles discharges criteria such as pain, range of motion and capacity quadriceps contraction, besides the use of a validated scale to measure the patient's functional independence. *Results:* 50% and 6.4% of patients prefer remain hospitalized after 24 and 48 hours of surgery, respectively. The average of the visual analogue scale of pain was 2.63 and 1.76 points, and the range of motion of 79° and 86,7° after 24 and 48 hours, respectively. 100% of patients were able to quadriceps contraction in every evaluated moments. *Conclusion:* In Brazil, possible discharged criteria as pain, range of motion, quad contraction and motor independence motor function scale show that anterior cruciate reconstruction reconstructed patients could be discharged after 24 hours of surgery. However, 50% of patients still prefer to remain hospitalized for longer periods.

★*Work performed at Escola Paulista de Medicina, Universidade Federal de São Paulo, and at Instituto Cohen, São Paulo, SP, Brazil*

**Corresponding author at:* Rua Borges Lagoa 783, 5° andar, Vila Clementino, São Paulo, SP, Brazil. CEP 04038-032
E-mail: mcastur@yahoo.com (D.C. Astur).

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Por que o paciente submetido à reconstrução do Ligamento Cruzado Anterior no Brasil permanece internado por um período superior a outros países? Avaliação Prospectiva de 30 pacientes e apresentação de possíveis critérios de alta hospitalar

Palavras-chave:
Alta do paciente
Ligamento cruzado anterior
Tempo de internação

RESUMO

Objetivo: Avaliar o momento considerado ideal pela equipe médica e pelo paciente para receber alta e relacioná-lo com possíveis critérios de alta médica. Métodos: Foram submetidos à reconstrução do ligamento cruzado anterior sob condições semelhantes 31 pacientes avaliados prospectivamente sobre a possibilidade de alta médica com 24 e 48 horas de cirurgia e possíveis critérios de alta, como dor, arco de movimento e capacidade de contração do quadríceps, além do uso de uma escala validada para medir a independência funcional motora do paciente. Resultados: A permanência hospitalar após 24 horas de cirurgia é preferida por 50% dos pacientes, enquanto que 6,3% preferem permanecer por mais de 48 horas após a cirurgia. A média do valor da escala visual analógica de dor foi de 2,63 e 1,76 pontos; e o arco de movimento de 79° e 86,7° após 24 e 48 horas, respectivamente. Todos os pacientes foram capazes de contrair o quadríceps em todos os momentos avaliados. Conclusão: No Brasil, critérios possíveis de alta, como avaliação da dor, do arco de movimento, do controle do quadríceps e da independência funcional motora, mostram que seria possível o paciente submetido à reconstrução artroscópica do LCA receber alta com 24 horas. Entretanto, 50% dos pacientes ainda preferem permanecer internados no hospital por período mais prolongado.

Introduction

Anterior cruciate ligament (ACL) injury results in pain and anteroposterior and rotational instability of the knee.[1,2]

Surgical treatment with ligament reconstruction is considered to be the gold standard for young patients and athletes.[3,4] Anatomical reconstruction of this ligament favors execution of the functions of the native ligament and promotes greater stability for the injured knee.[5,6] The recovery for returning to sports activities is not immediate, and physiotherapeutic treatment for intensive rehabilitation is needed. Nonetheless, the evolution of surgical techniques and improvement of analgesic agents have made the immediate postoperative period less painful and have provided a greater degree of functional independence for patients.[6-8] However, although it is common in some countries for patients to be discharged on the same day, the length of hospital stay in Brazil and consequently the cost of hospitalization are very high.[7,9,10]

The objective of this study was to evaluate the ideal time for patient discharge, as perceived by the medical team and by the patient, and to correlate this with possible medical discharge criteria by means of a prospective evaluation on patients who underwent ACL reconstruction.

Methods

This project was evaluated and approved by the Research Ethics Committee of the Federal University of São Paulo, under code 1181/11.

Thirty-one patients were evaluated and were asked about the possibility of being medically discharged 24 and 48 hours after the surgical procedure.

The patient inclusion criteria were defined as follows: age between 18 and 40 years; with acute ACL injury; with or without associated meniscal injury; and use of a graft from the tendons of the semitendinosus and gracilis muscles ipsilateral to the affected knee.

The exclusion criteria were defined as follows: presence of associated chondral or bone lesions; use of other types of graft; surgery for revision of previous ligament reconstructions; concomitant surgery on the contralateral limb; or other surgical procedures associated with ACL reconstruction that might interfere with the postsurgical analgesia.

All the surgical reconstructions on the ACL were performed by the same orthopedic surgeon, who was qualified for and had experience of this type of surgery.

For all the ligament reconstructions, the following were used: pneumatic tourniquet; anteromedial incision to harvest the graft from the flexor tendons; a transportal reconstruction technique; tibial fixation using an absorbable interference screw; and femoral fixation using a transverse screw. All the procedures took between one and two hours, without any intercurrences that might have changed the results.

After the surgery, all the patients remained hospitalized for 48 hours and received the same regimen of postoperative intravenous analgesia (Table 1).

Table 1 – Intra-hospital postoperative intravenous analgesia regimen.

Medication	Dose	Times
Dipyrone	500 mg	Every 4 h
Ketoprofen	100 mg	Every 12 h
Tramadol	100 mg	Every 8 h
Morphine	2 mg	If pain is present

During the hospital stay, the patients were examined 24 and 48 hours after the surgery in order to evaluate the following parameters: pain intensity, by means of a visual analogue scale (VAS), such that 0 was absence of pain and 10 was intolerable pain; range of motion of the knee joint, effected by means of a continuous passive motion (CPM) apparatus; and active control over the quadriceps of the injured knee.

The patients also underwent functional evaluation using a scale for measuring functional independence, for motor assessment 24 hours after the surgical procedure[11] (Tables 2 and 3).

Statistical analysis was performed to evaluate the results encountered. To analyze the study variables, the chi-square, Fisher's exact and Student's t tests were used. To evaluate the functional independence scale, the Mann-Whitney test was used.

Table 2 - Description of the motor tasks evaluated through measuring the functional independence of patients who underwent anterior cruciate ligament reconstruction.

Motor tasks evaluated through measuring functional independence	
Self-care	Self-care
	Morning hygiene
	Bath/shower
	Getting dressed above the waistline
	Getting dressed below the waistline
	Using toilet
Sphincter control	Urine control
	Feces control
Transfers	Transfers
	Toilet
	Shower or bath
Locomotion	Locomotion
	Stairs

Table 3 - Patient's condition of functional dependence and scores corresponding to the different activities evaluated.

Levels of functional dependence
1 Complete independence
2 Modified independence
3 Supervision, stimulation or preparation
4 Minimal dependence
5 Moderate dependence
6 Maximum dependence
7 Total dependence

Results

Thirty-one patients who underwent arthroscopic ACL reconstruction were evaluated. Only one of the patients evaluated was excluded from the sample: this exclusion was because mosaicplasty was performed concomitantly due to a significant chondral lesion.

Twenty-one male patients and nine female patients were evaluated, with a mean age of 33 years. Among the knees operated, 17 were right and 13 were left knees.

All the patients were considered to have a high socioeconomic level, and most of them were liberal professionals. All of the patients had suffered an ACL injury while practicing a professional or amateur physical activity.

The shortest duration among the surgical procedures was 58 minutes, while the longest was 1 hour and 46 minutes. There was no difference between the lengths of time for the surgery ($p > 0.05$). No suction drains were used postoperatively for any of the patients. After discharge, daily telephone contact with the patient was maintained for the first seven days and the patient attended medical consultations on the fourth and seventh postoperative days.

Fifteen patients thought that they would have been ready to be discharged 24 hours after the surgery, while the other half of the patients thought that it was better to stay in hospital (Table 4).

Twenty-four hours after the surgery, the mean VAS score was 2.63 points, the mean range of motion acquired by the patients through using CPM was 79 degrees and their capacity to contract the quadriceps muscle was 100%.

At the time of hospital discharge, i.e. 48 hours after the surgery, 93.7% agreed that this was the ideal moment to be discharged from hospital. The mean VAS score was 1.76, the mean range of motion acquired by the patients through using CPM was 86.7 degrees and their capacity to contract the quadriceps muscle remained 100% (Table 5).

Table 4 - Predominance of males and of right knees. Patients of mean age 33 years who preferred not to be discharged from hospital within the first 24 hours. The majority of the patients judged that 48 hours after the surgery was a good time for hospital discharge.

Variable	Total		Variable	Total	
	n	%		n	%
Sex			**Discharge 24h**		
Female	9	30	No	15	50
Male	21	70	Yes	15	50
Knee			**Discharge 48h**		
Right	17	56.7	No	2	6.7
Left	13	43.3	Yes	28	93.3
Age					
Mean (SD)			33.0 (10.0)		
Total	**30**	**100**	**Total**	**30**	**100**

Table 5 – List of the 30 patients evaluated and asked about the possibility of hospital discharge, and the knee range-of-motion values measured using CPM and pain intensity from the visual analogue scale (VAS).

Evaluation of range of motion and use of CPM				
Patient	VAS 24h	VAS 48h	CPM(°) 24h	CPM(°) 48h
1	5	0	60	90
2	5	0	90	110
3	0	2	85	90
4	1	5	60	70
5	0	0	90	90
6	0	1	90	90
7	3	3	95	95
8	1	1	70	70
9	5	5	90	95
10	5	2	95	105
11	7	7	70	70
12	0	0	100	100
13	4	1	80	85
14	2	0	65	75
15	2	0	65	80
16	0	0	90	90
17	1	0	70	70
18	0	3	80	90
19	5	3	100	100
20	3	5	90	90
21	7	1	70	75
22	0	1	70	75
23	3	2	90	90
24	2	2	90	90
25	2	2	60	90
26	2	0	70	90
27	2	0	80	90
28	4	1	95	100
29	3	3	55	70
30	5	3	55	75
Mean	2.63	1.76	79	86.7

CPM, continuous passive movement apparatus; VAS, visual analogue scale.

According to the functional independence scale, the mean value attained by the patients 24 hours after the surgery was 55.9 of the 91 points possible.

Discussion

Attempts to minimize the length of hospital stay among patients undergoing arthroscopic ACL reconstruction may promote reductions in medical and hospital costs and may provide greater comfort to patients.

Among the criteria defined for early discharge of patients undergoing this type of surgery, there is still a lack of analysis on each individual variable that might influence the postoperative results. In some European countries and in the United States, it is common for patients undergoing arthroscopic ACL reconstruction to be discharged from hospital on the same day as the operation, but without the backing of any criteria defined in the literature.[10,11]

Through analyzing 30 patients who underwent ACL reconstruction with the same surgical technique applied in the same hospital and with the same surgeon, i.e. a homogenous sample of patients and surgical results, we sought to understand the patients' reactions relating to the possibility of being released from hospital within the first 24 hours after the surgery, and to correlate these with some subjective and objective data relating to pain, range of motion and capacity to contract the quadriceps muscle.

The patients also underwent evaluations on their motor functional independence at the same time. Their abilities in relation to the following activities were assessed: self-care, having a bath/shower, performing intimate hygiene, getting dressed above and below the waistline, using the toilet, mobility for having a bath/shower, mobility for moving to a bed or a chair, moving to the toilet, sphincter control and capacity for going up stairs. Scores between 0 and 7 were given by the patient, with a possible total score of 91 points. The impression gained, based on the results obtained, was that the patients already presented motor functional independence that was quite sufficient for them to be medically discharged 24 hours after the surgery. In the present study, one day after the surgery, the patients presented a mean total of 55.9 points among the daily activities evaluated, which corresponded to 62% of their maximum capacity. Based on other functional evaluations, some studies have suggested that patients who are discharged from hospital on the same day present higher satisfaction ratings than do patients who are discharged on the next day, thus suggesting that hospital discharge should take place within the first 24 hours.[10]

Within our setting, half of the patients did not believe that, 24 hours after the surgery, they were already in a condition to be medically discharged. Although the numbers did not show much significance, the analysis on the parameters evaluated strongly suggested that patient discharge at this time was favored. The mean VAS pain score was 2.63 points, on a scale from absence of pain scoring 0 to maximum intensity of pain scoring 10. The range of motion achieved through using CPM was 79 degrees and the capacity to contract the quadriceps was 100%. All the data obtained suggest that the patients had mild pain, acceptable range of motion and low motor dependence. It seems acceptable that with these values hospital discharge is envisaged, like in other countries, even if there is no validated protocol or any defined criteria for discharge.[7,9,10]

At the time of hospital discharge, 48 hours after the surgery, the VAS values continued to be suggestive of mild pain (VAS of 1.76), with a greater range of motion (86.7º) and maintaining 100% ability to contract the quadriceps. At this point, 96.7% of the patients felt safe in accepting medical discharge from hospital.

Cultural influences, care conditions in hospital beds that are often much better than in patients' own homes and a feeling of security from being inside a medical center may suggest that Brazilian patients are unwilling to accept very early hospital discharge.[12] Nonetheless, the factors involved in keeping patients in hospital range from the hospital costs, which could have been minimized, to the high risk of complications such as infections, which often delay the start of the rehabilitation process.

The possibility of minimizing the length of hospital stay, and all the implications resulting from this, when patients are known to be in a condition to be discharged from hospital, suggests that there is a need for new protocols for hospital discharge should be developed.

Conclusion

In Brazil, the possible hospital discharge criteria such as assessments of pain, range of motion, quadriceps control and motor functional independence show that it would be possible for patients undergoing arthroscopic ACL reconstruction to be discharged within the first 24 hours. However, 50% of the patients still prefer to remain in hospital for longer periods.

Conflicts of interest

The authors declare no conflicts of interest.

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