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Effectiveness of Online Video Instruction on Time to Start Ambulation and Duration of Hospital Stay, Satisfaction and Functional Recovery in Patients Undergoing Total Hip Arthroplasty

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ABSTRACT

Background: At the end of 2014, we implemented an online video to inform patients of the entire process from admission to rehabilitation after total hip arthroplasty (THA). In this study, we investigated the effectiveness of online video instruction in THA patients.

Methods: Electronic medical records of 184 patients undergoing THA in 2014 (pre-video group) and 182 patients in 2015 (post-video group) were reviewed. We compared 1) the time to start wheelchair ambulation, 2) walker or crutch ambulation, 3) the length of hospital stay, 4) postoperative satisfaction using visual analogue scale (0–10 points), and 5) modified Harris Hip Score (mHHS) at postoperative 6 weeks.

Results: In the post-video group, the time to start wheelchair ambulation (1.8 ± 0.6 vs. 2.4 ± 3.2 days, $P = 0.021$) and walker/crutch ambulation were faster (2.9 ± 1.2 vs. 3.8 ± 1.0 days, $P = 0.016$), and the hospital stay was shorter (8.2 ± 4.7 vs. 9.9 ± 7.8 days, $P = 0.001$) compared to the pre-video group. The visual analogue scale for satisfaction (7.84 ± 1.62 vs. 7.68 ± 1.85 points) and mHHS (89.59 ± 9.47 vs. 89.58 ± 8.59) were similar.

Conclusion: Online video instruction is an effective tool to expedite ambulation and reduce the hospital stay without compromising the clinical outcome and postoperative complications after THA.

Keywords: Hip; Arthroplasty; Education; Online Video

INTRODUCTION

Total hip arthroplasty (THA) is a successful treatment of patients with advanced hip disease, which has been nominated as the operation of the century.¹ Nevertheless, it could be an invasive and painful procedure to the patient.² It involves removal of bone and insertion of an artificial joint. The THA patients should be hospitalized and are anxious about postoperative

Disclosure

The authors have no potential conflicts of interest to disclose.

Author Contributions

Data curation: Won SJ, Park SJ. Formal analysis: Lee YK. Methodology: Koo KH. Supervision: Koo KH. Visualization: Park JW. Writing - original draft: Kim HS. Writing - review & editing: Lee YK, Park JW.

pain, risk of transfusion, medical cost, duration of rehabilitation, risk of complications, and possibility of poor outcome. Moreover, fast-track protocol have been introduced in THA to reduce the duration of hospital stay worldwide.^{3,4} However, this protocol might increase patients' anxiety and compromise their satisfaction.⁵

Recently, multimedia tools including online video have been introduced to provide patients with information they want to know. On December 30, 2014, our department implemented an online video program to provide detailed information about the whole process from admission to discharge and postoperative rehabilitation to THA patients.

In this before-after study on the effectiveness of the online video instruction, we compared 1) time to start ambulation, 2) the duration of hospitalization, 3) patients' satisfaction and 4) clinical outcome at postoperative 6 weeks. Because primary diagnosis of the hip disease and surgeon's factor might influence these outcomes, we restricted the subjects of this study to patients who were operated due to osteonecrosis of the femoral head (ONFH) by a single surgeon.

METHODS

The present study was approved from the local hospital institutional review board review. From January 2014 to December 2015, 397 patients underwent primary THA due to ONFH by one surgeon at our department. Among them, 31 patients who underwent bilateral THA were excluded. This left 366 patients (366 THAs): 184 patients operated in 2014 (pre-video group) and 182 patients operated in 2015 (post-video group) (Fig. 1).

Once THA was scheduled, the surgeon and physician's assistant explained the type of anesthesia, surgical procedure, implant to be used, complications of THA, postoperative rehabilitation, duration of hospital stay, expected cost, and time of returning to work and recreational activity, and expected longevity of the prosthesis. While a booklet, which included above information, was given to patients in the pre-video group, a 12-minutes online video (<https://hichart.tv/fCCL>) was reinforced as well as the booklet in the post-video group. The video could be assessed via various tools: digital monitor of smart bed system in our hospital,⁶ smart phone or personal computer accessible to internet.

Just before skin incision, 1 gram of tranexamic acid was injected intravenously to reduce bleeding. All THAs were done with a single prosthetic design (Mirabo cup and M stem; Corentec, Cheonan, Korea) and delta-on-delta ceramic articulation (BIOLOX delta; CeramTec, Plochingen, Germany) using Kocher-Langenbeck approach.⁷ We did not put suction drainage. Patients were encouraged to ambulate on wheelchair 1 day after the operation and to walk with crutches on the postoperative day 2. Patients were advised to

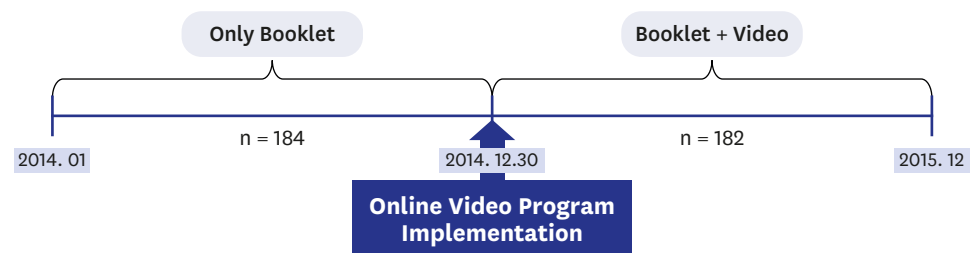


Fig. 1. Diagram of the included patients before and after the implementation of the online video program.

discharge when they could walk alone and there was no problem in the wound. The patient's satisfaction was measured on the postoperative day 5 and the functional outcome was evaluated at postoperative 6-week follow-up.

We retrospectively reviewed the medical records of the 366 patients: 184 patients in the pre-video group and 182 patients in the post-video group, to compare 1) the time to start wheel chair ambulation; 2) the time to start ambulation using walker or crutch; 3) the length of hospital stay; 4) postoperative satisfaction using visual analogue scale from 0 to 10 points; and 5) functional outcome using modified Harris Hip Score (mHHS) between the two groups.

Student's *t*-test was used for the comparison of numerical variables and χ^2 test for the comparison of categorical variables. A *P* value less than 0.05 was considered statistically significant. Statistical analyses were performed using SPSS version 15.0 (SPSS Inc., Chicago, IL, USA).

Ethics statement

As a retrospective study, this study holds out no additional risk to participants and it is approved by Seoul National University Bundang Hospital Institutional Review Board (IRB No. B-2103/672-101) with the waiver of informed consents.

RESULTS

There were no significant differences in patient demographics, stage of ONFH, American Society of Anesthesiologists (ASA) score, Charlson comorbidity index, type of anesthesia, the amount of bleeding, the volume of transfusion.

There were no significant differences in the incidences of systemic complications (pneumonia, deep vein thrombosis/pulmonary embolism, myocardial infarction, and cerebral infarction) and surgical complications (dislocation, infection, periprosthetic fracture, sciatic nerve injury) between the two groups (Table 1).

Table 1. Comparison of demographics between pre-video group and post-video group

Characteristics	Pre-video group (n = 184)	Post-video group (n = 182)	<i>P</i> value
Sex			
Male	87 (47)	102 (56)	0.094
Female	97 (53)	80 (44)	
Age	53.9 ± 13.9	53.6 ± 14.3	0.812
BMI	24.6 ± 3.5	24.7 ± 3.5	0.664
ASA score	1.6 ± 0.6	1.5 ± 0.5	0.284
CCI	0.6 ± 1.2	0.5 ± 1.0	0.564
Type of anesthesia			
Spinal	174 (95)	175 (96)	0.349
General	6 (3)	2 (1)	
Spinal + Epidural	4 (2)	5 (3)	
Intraoperative estimated blood loss, mL	787.7 ± 347.4	775.8 ± 316.4	0.716
Amount of postoperative drainage, mL	473.6 ± 255.7	446.9 ± 241.2	0.275
Total amount of bleeding, mL	1,261.2 ± 477.81	1,222.6 ± 441.32	0.394
Volume of transfusion, mL	265.7 ± 357.4	256.3 ± 384.2	0.796
Surgical complication			
Yes	14 (8)	12 (7)	0.705
No	170 (92)	170 (93)	

Age, BMI, ASA score, CCI, amount of bleeding, volume of transfusion are shown in mean ± standard deviation. Sex, type of anesthesia, surgery-related problem are expressed as frequency and percentage. ASA = American Society of Anesthesiologists, CCI = Charlson comorbidity index, BMI = body mass index.

Table 2. Comparison of postoperative data between pre-video group and post-video group

Characteristics	Pre-video group (n = 184)	Post-video group (n = 182)	P value
Postoperative complication			
Yes	78 (42)	74 (41)	0.155
No	106 (58)	108 (59)	
Time to wheelchair ambulation, day	2.4 ± 3.2	1.8 ± 0.6	0.021
Time to walker/crutch ambulation, day	3.8 ± 1.0	2.9 ± 1.2	0.021
Length of hospital stay	9.8 ± 7.8	8.2 ± 4.7	0.016
Satisfaction score	7.9 ± 1.6	7.7 ± 1.9	0.897
mHHS	89.6 ± 9.5	89.6 ± 8.6	0.891

Time to wheelchair ambulation, time to walker/crutch ambulation, length of hospital stay satisfaction score, mHHS are shown in mean ± standard deviation. Postoperative complication is expressed as frequency and percentage.

mHHS = modified Harris Hip Score.

In the post-video group, the time to start wheelchair ambulation was faster (1.8 ± 0.6 vs. 2.4 ± 3.2 days, $P = 0.021$), the time to start walker/crutch ambulation was faster (2.9 ± 1.2 vs. 3.8 ± 1.0 days, $P = 0.016$), and the duration of hospital stay was shorter (8.2 ± 4.7 vs. 9.9 ± 7.8 days, $P = 0.001$) compared to the pre-video group.

The postoperative satisfaction score (7.8 ± 1.6 vs. 7.7 ± 1.9) and mHHS at postoperative 6 weeks (89.6 ± 9.5 vs. 89.6 ± 8.6) were similar between the two groups (Table 2).

DISCUSSION

Our study showed that preoperative online video instruction expedited ambulation and reduced the duration of hospital stay without compromising patient's satisfaction and functional outcome after THA.

Patients undergoing surgery are anxious about what will happen during the hospitalization period, the potential complications and outcomes of the surgery.^{8,9} Preoperative anxiety had been known to negatively affect the clinical outcome and satisfaction following total knee arthroplasty (TKA).¹⁰⁻¹²

In 2004, McGregor et al.¹³ reported that preoperative instruction of rehabilitation advice reinforced by a patient information booklet expedited functional recovery and patient's satisfaction after THA. Moreover, the preoperative class and booklet reduced the hospital stay by 3 days, therapy input required, and consequently the medical cost. The increase of elderly patients undergoing hip arthroplasty furthermore underlines the importance of education throughout the admission and surgery.^{14,15}

To date, numerous articles have been published on the effect of preoperative education on alleviating postoperative complications. These approaches incorporated various teaching tools including: DVD/video,¹⁶⁻²⁰ online education/websites,²¹⁻²³ and booklets/pamphlets^{16,24-26} were incorporated in the preoperative education. In a review of 13 randomized control trials involving a total of 1,017 subjects who underwent THA or TKA,²⁷ educations through these sources appeared to increase knowledge of the surgical procedure reduce anxiety, reduce postoperative pain, decrease length of hospital stay, and reduce the time to return to preoperative functional levels.

Currently, patient instruction is more important than before because fast track procedure, bundled payment, and diagnosis-related group have become popular trends worldwide and THA patients should be discharged shortly after the operation. Patients do not have enough opportunity and time to contact with the medical staff for counseling.²⁸⁻³⁰ Thus, efforts should be made to instruct patients prior to surgery to relieve their anxiety.^{31,32}

So far, leaflets and brochures have been used as supplementary materials to instruct patients.³³ However, widespread use of smartphones enabled the online delivery of information and audiovisual sources became a teaching strategy for patient education.³⁴

There are limitations in this study. First, it is a retrospective before-after review and there is a risk of unidentified confounders. Second, we included a patient cohort of single disease (ONFH) and our study was done in East Asia. Our results might be otherwise in other patient cohorts.

Preoperative instruction reinforced by an online video can expedite ambulation and reduce hospital stay after THA. We recommend the use of this educational strategy for patients undergoing total joint arthroplasty and other orthopedic surgical procedures.

REFERENCES

1. Learmonth ID, Young C, Rorabeck C. The operation of the century: total hip replacement. *Lancet* 2007;370(9597):1508-19.
[PUBMED](#) | [CROSSREF](#)
2. Williams JG, Jones JR. Psychophysiological responses to anesthesia and operation. *JAMA* 1968;203(6):415-7.
[PUBMED](#) | [CROSSREF](#)
3. Van Den Eeden YN, De Turck BJ, Van Den Eeden FM. 24 hours stay after hip replacement. *Acta Orthop* 2017;88(1):24-8.
[PUBMED](#) | [CROSSREF](#)
4. Suh YS, Nho JH, Seo J, Jang BW, Park JS. Hip fracture surgery without transfusion in patients with hemoglobin less than 10 g/dL. *Clin Orthop Surg* 2021;13(1):30-6.
[PUBMED](#) | [CROSSREF](#)
5. Lee A, Chui PT, Gin T. Educating patients about anesthesia: a systematic review of randomized controlled trials of media-based interventions. *Anesth Analg* 2003;96(5):1424-31.
[PUBMED](#) | [CROSSREF](#)
6. Yoo S, Lee KH, Baek H, Ryu B, Chung E, Kim K, et al. Development and User research of a smart bedside station system toward patient-centered healthcare system. *J Med Syst* 2015;39(9):86.
[PUBMED](#) | [CROSSREF](#)
7. Tosounidis TH, Giannoudis VP, Kanakaris NK, Giannoudis PV. The Kocher-Langenbeck approach: state of the art. *JBJs Essential Surg Tech* 2018;8(2):e18.
[PUBMED](#) | [CROSSREF](#)
8. Jjala HA, French JL, Foxall GL, Hardman JG, Bedford NM. Effect of preoperative multimedia information on perioperative anxiety in patients undergoing procedures under regional anaesthesia. *Br J Anaesth* 2010;104(3):369-74.
[PUBMED](#) | [CROSSREF](#)
9. Shevde K, Panagopoulos G. A survey of 800 patients' knowledge, attitudes, and concerns regarding anesthesia. *Anesth Analg* 1991;73(2):190-8.
[PUBMED](#) | [CROSSREF](#)
10. Han HS, Lee JY, Kang SB, Chang CB. The relationship between the presence of depressive symptoms and the severity of self-reported knee pain in the middle aged and elderly. *Knee Surg Sports Traumatol Arthrosc* 2016;24(5):1634-42.
[PUBMED](#) | [CROSSREF](#)
11. Kim KW, Han JW, Cho HJ, Chang CB, Park JH, Lee JJ, et al. Association between comorbid depression and osteoarthritis symptom severity in patients with knee osteoarthritis. *J Bone Joint Surg Am* 2011;93(6):556-63.
[PUBMED](#) | [CROSSREF](#)

12. Xu J, Twigg J, Parker D, Negus J. The association between anxiety, depression, and locus of control with patient outcomes following total knee arthroplasty. *J Arthroplasty* 2020;35(3):720-4.
[PUBMED](#) | [CROSSREF](#)
13. McGregor AH, Rylands H, Owen A, Doré CJ, Hughes SP. Does preoperative hip rehabilitation advice improve recovery and patient satisfaction? *J Arthroplasty* 2004;19(4):464-8.
[PUBMED](#) | [CROSSREF](#)
14. Jo S, Lee SH, Yoon SJ. Clinical outcomes of total hip arthroplasty for displaced femoral neck fractures in patients 80 years of age and older selected by clinical frailty score. *Hip Pelvis* 2020;32(3):148-55.
[PUBMED](#) | [CROSSREF](#)
15. Kim BS, Lim JY, Ha YC. Recent epidemiology of hip fractures in South Korea. *Hip Pelvis* 2020;32(3):119-24.
[PUBMED](#) | [CROSSREF](#)
16. Bondy LR, Sims N, Schroeder DR, Offord KP, Narr BJ. The effect of anesthetic patient education on preoperative patient anxiety. *Reg Anesth Pain Med* 1999;24(2):158-64.
[PUBMED](#)
17. Chen HH, Yeh ML, Yang HJ. Testing the impact of a multimedia video CD of patient-controlled analgesia on pain knowledge and pain relief in patients receiving surgery. *Int J Med Inform* 2005;74(6):437-45.
[PUBMED](#) | [CROSSREF](#)
18. Lin PC, Lin LC, Lin JJ. Comparing the effectiveness of different educational programs for patients with total knee arthroplasty. *Orthop Nurs* 1997;16(5):43-9.
[PUBMED](#) | [CROSSREF](#)
19. McEwen A, Moorthy C, Quantock C, Rose H, Kavanagh R. The effect of videotaped preoperative information on parental anxiety during anesthesia induction for elective pediatric procedures. *Paediatr Anaesth* 2007;17(6):534-9.
[PUBMED](#) | [CROSSREF](#)
20. Wilhelm D, Gillen S, Wirnhier H, Kranzfelder M, Schneider A, Schmidt A, et al. Extended preoperative patient education using a multimedia DVD-impact on patients receiving a laparoscopic cholecystectomy: a randomised controlled trial. *Langenbecks Arch Surg* 2009;394(2):227-33.
[PUBMED](#) | [CROSSREF](#)
21. Heikkinen K, Helena LK, Taina N, Anne K, Sanna S. A comparison of two educational interventions for the cognitive empowerment of ambulatory orthopaedic surgery patients. *Patient Educ Couns* 2008;73(2):272-9.
[PUBMED](#) | [CROSSREF](#)
22. Macario A, Schilling P, Rubio R, Bhalla A, Goodman S. What questions do patients undergoing lower extremity joint replacement surgery have? *BMC Health Serv Res* 2003;3(1):11.
[PUBMED](#) | [CROSSREF](#)
23. Saryeddine T, Levy C, Davis A, Flannery J, Jaglal S, Hurley L, et al. Patient education as a strategy for provider education and engagement: a case study using myJointReplacement.ca. *Healthc Q* 2008;11(1):84-90.
[PUBMED](#) | [CROSSREF](#)
24. Adam JA, Khaw FM, Thomson RG, Gregg PJ, Llewellyn-Thomas HA. Patient decision aids in joint replacement surgery: a literature review and an opinion survey of consultant orthopaedic surgeons. *Ann R Coll Surg Engl* 2008;90(3):198-207.
[PUBMED](#) | [CROSSREF](#)
25. Cheung A, Finegan BA, Torok-Both C, Donnelly-Warner N, Lujic J. A patient information booklet about anesthesiology improves preoperative patient education. *Can J Anaesth* 2007;54(5):355-60.
[PUBMED](#) | [CROSSREF](#)
26. Courtney MJ. The effect of a preanaesthetic information booklet on patient understanding and satisfaction. *N Z Med J* 1997;110(1045):212-4.
[PUBMED](#)
27. Louw A, Diener I, Butler DS, Puentedura EJ. Preoperative education addressing postoperative pain in total joint arthroplasty: review of content and educational delivery methods. *Physiother Theory Pract* 2013;29(3):175-94.
[PUBMED](#) | [CROSSREF](#)
28. Kim B, Park S, Park K, Ryoo S. Effects of a surgical ward care protocol following open colon surgery as part of an enhanced recovery after surgery programme. *J Clin Nurs* 2017;26(21-22):3336-44.
[PUBMED](#) | [CROSSREF](#)
29. Jefford M, Lotfi-Jam K, Baravelli C, Grogan S, Rogers M, Krishnasamy M, et al. Development and pilot testing of a nurse-led posttreatment support package for bowel cancer survivors. *Cancer Nurs* 2011;34(3):E1-10.
[PUBMED](#) | [CROSSREF](#)

30. Heitzmann CA, Merluzzi TV, Jean-Pierre P, Roscoe JA, Kirsh KL, Passik SD. Assessing self-efficacy for coping with cancer: development and psychometric analysis of the brief version of the Cancer Behavior Inventory (CBI-B). *Psychooncology* 2011;20(3):302-12.
[PUBMED](#) | [CROSSREF](#)
31. Ramesh C, Nayak BS, Pai VB, Patil NT, George A, George LS, et al. Effect of preoperative education on postoperative outcomes among patients undergoing cardiac surgery: a systematic review and meta-analysis. *J Perianesth Nurs* 2017;32(6):518-529.e2.
[PUBMED](#) | [CROSSREF](#)
32. Fredericks S, Yau T. Clinical effectiveness of individual patient education in heart surgery patients: a systematic review and meta-analysis. *Int J Nurs Stud* 2017;65:44-53.
[PUBMED](#) | [CROSSREF](#)
33. Friedman AJ, Cosby R, Boyko S, Hatton-Bauer J, Turnbull G. Effective teaching strategies and methods of delivery for patient education: a systematic review and practice guideline recommendations. *J Cancer Educ* 2011;26(1):12-21.
[PUBMED](#) | [CROSSREF](#)
34. Drott J, Vilhelmsson M, Kjellgren K, Berterö C. Experiences with a self-reported mobile phone-based system among patients with colorectal cancer: a qualitative study. *JMIR Mhealth Uhealth* 2016;4(2):e66.
[PUBMED](#) | [CROSSREF](#)