

THE EFFECT OF ADDITIONAL TELEROUNDING ON POSTOPERATIVE OUTCOMES, PATIENT AND SURGEON SATISFACTION RATES IN THE PATIENTS WHO UNDERWENT PERCUTANEOUS NEPHROLITHOTOMY

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Summary.- INTRODUCTION: We wanted to investigate the potential effect of additional telerounding system on postoperative outcomes, patient and surgeon satisfaction rates in the patients who underwent percutaneous nephrolithotomy (PNL).

METHODS: Eighty patients who underwent PNL were included in the study. The patients were randomly divided to two groups. Group 1 included 40 patients who were followed-up with standard rounds and group

2 included 40 patients who were followed-up with telerounding in addition to standard rounds. Patient and surgeon satisfaction rates were assessed with a visual analog scale (VAS) where 0 point represents very dissatisfied and 100 points very satisfied.

RESULTS: Mean time of preoperative telerounding visit was 3.65 ± 0.59 (2-4) minutes. Mean time of telerounding visits on the postoperative 1st and 2nd days was 3.80 ± 0.62 and 2.9 ± 0.91 minutes respectively. The VAS score evaluating the surgeon's satisfaction rate for telerounding was 91 ± 11.2 and patients expressed a high level of satisfaction with 72.5%.

CONCLUSION: The use of additional telerounding in urological patient care provides high satisfaction rates for both the patients and the surgeon. However the findings of the present study don't underestimate the importance of personal surgeon-patient interaction.

Keywords: Percutaneous nephrolithotomy. Telemedicine. Telementoring. Telerounding.

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Resumen.- INTRODUCCIÓN: Queríamos investigar el efecto potencial de un sistema de televisita sobre los resultados postoperatorios y la satisfacción de pacientes y cirujanos en casos de nefrolitotomía percutánea (NLP)

MÉTODOS: Se incluyeron en el estudio ochenta pacientes sometidos a NLP. Los pacientes se dividieron aleatoriamente en dos grupos. Grupo 1: incluyó 40 pacientes que hicieron un seguimiento estándar y grupo 2 con 40

pacientes que fueron seguidos con televisitas además del seguimiento estándar. La satisfacción del paciente y el cirujano se evaluó con una escala visual analógica (EVA) donde el 0 representa muy insatisfecho y el 100 muy satisfecho.

RESULTADOS: El tiempo medio de la televisita preoperatoria fue de $3,65 \pm 0,59$ (2-4) minutos. El tiempo medio de televisita en los días 1º y 2º postoperatorio fue de $3,80 \pm 0,62$ y $2,9 \pm 0,91$ minutos respectivamente. La puntuación de la EVA que evaluaba la satisfacción del cirujano para la televisita fue de $91 \pm 11,2$ y los pacientes expresaron un alto nivel de satisfacción con el 72,5%.

CONCLUSIONES: El uso de televisitas adicionales en la asistencia urológica ofrece una alta satisfacción tanto para el paciente como para el cirujano. Sin embargo, los hallazgos del presente estudio no infravaloran la importancia de la interacción personal paciente-cirujano.

Palabras clave: Nefrolitotomía percutánea. Telemedicina. Telementoring. Televisita.

INTRODUCTION

Telemedicine is the use of medical information exchanged from one site to another via electronic communications. In telemedicine applications, multimedia data are exchanged including text, still images, one-dimensional data, audio and video (1,2). Telemedicine was firstly described by Aronson SH (3), at 1977 with the use of telephone and a few years later e-mail had began to use for telemedicine (4). Johansen MA et al used e-mail communication for the follow-up of burns in pediatric patients. The parents sent the burn photos of their child day by day via e-mail (5). Advances in technology have opened new avenues for long-distance communication through telemedicine; telerounding and telementoring (6-9).

Telerounding is described as remote patient rounding by using computers, laptops, cameras, smart phones and tablets. It was firstly reported by Ellison et al using a computer with a camera for telerounding installed on a remotely controlled custom service robot platform at 2004 (10). They emphasized that the patients in the telerounding arm demonstrated statistically substantial improvements in ratings of examination thoroughness, quality of discussions about medical information, postoperative care coordination, and attending physician availability. Previous studies were done by telerobots or wireless laptops

on wheels that would be moved from room to room to allow physicians and patients to have a video-conference (10-12). However with the use of tablets and smart phones, telerounding has become easier and more useful (13).

Telerounding has also become a new trend in urology and we aimed to investigate the potential effect of additional telerounding system on postoperative outcomes, patient and surgeon satisfaction rates in the patients who underwent percutaneous nephrolithotomy (PNL).

MATERIALS AND METHODS

Following institutional ethical committee approval, eighty patients who underwent PNL were included in the study. All patients were operated by the same surgeon and had at least 2 days of hospital stay postoperatively. The patients were randomly divided to two groups. Group 1 included 40 patients who were followed-up with standard rounds and group 2 included 40 patients who were followed-up with telerounding (by the surgeon who performed the operation) in addition to standard rounds. In our clinic standard rounds are routinely performed by the operating surgeon and residents in the morning and by the residents in the evening. Telerounding was performed with the same commercially available high quality tablet using videoconferencing system via internet. The tablet we used in our study was a tablet PC (Galaxy tab SM-T700, android 4.4, Samsung, Korea).

We used Skype application serving for videoconferencing. There were no network problems with wireless local area network (WLAN) connection during the study. Additional telerounding visits by the operating surgeon, were performed on the evening before the surgery and each night during the hospital stay of the patients postoperatively. Two groups were compared for patients' characteristics and postoperative outcomes. Patient and surgeon satisfaction rates were assessed with a visual analog scale (VAS) where 0 point represents very dissatisfied and 100 points very satisfied. All patients filled in the 'satisfaction' and 'quality of telerounding conference' surveys at the day of discharge. The surgeon also filled in the 'satisfaction' and 'quality of telerounding conference' surveys for each patient. Statistical analyses were performed with Statistical Package for Social Sciences version 21.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were noted. Continuous variables were compared with independent sample t test and categorical variables were compared with Chi-square and Fisher's exact tests. Statistical significance was set at a p value of <0.05.

Table I. Postoperative outcomes and characteristics of the patients followed with standard rounds (Group 1) and additional video rounding system (Group 2).

	Group 1 (n=40)	Group 2 (n=40)	p
Age, years	48.6±9.9	50.8±11.7	0.525
Gender (F/M)	12/28	10/30	0.723
Pain score (Postoperative 1st day)	5.1±1.3	4.5±1.6	0.244
Pain score (Postoperative 2nd day)	2.6±1.6	1.7±0.8	0.104
VAS score for patient satisfaction	85±13.4	87.5±16.2	0.639
Stone size, mm	312.8±272.4	252.2±117.7	0.367

VAS, visual analog scale

Values were given as mean ± standard deviation

RESULTS

A total of 80 patients were enrolled, 40 to standard rounds and 40 to tablet telerounds in addition to standard rounds. The two groups were similar based on baseline demographic measures. Mean age of the patients was 48.6 and 50.8 years in group 1

and 2 respectively. There were no significant differences in hospitalization time, mean stone size, nephrostomy time, mean VAS scores and postoperative fever rates between the two groups. Mean time of preoperative telerounding visit was 3.65±0.59 (2-4) minutes. Mean time of telerounding visits on the postoperative 1st and 2nd days were 3.80±0.62 (2-5) and 2.9±0.91

Table II. Outcomes of 'satisfaction' and 'quality of telerounding conference' surveys for the patients.

Questions of telerounding satisfaction survey for the patients	Mean	Standard deviation	Range
1. My hospital care was better because of telerounding (communicating with my doctor by the tablet using the internet)	72.5	13.7	40-90
2. I think that telerounding should be a regular part of patient care in the hospital	78.0	20.2	30-100
3. I could easily communicate with my doctor using telerounding	86.0	11.8	50-100
4. If I were hospitalized again, I would feel comfortable with telerounding on an everyday basis	85.5	10.5	60-100
5. If my doctor was not in the hospital and I was hospitalized, I would prefer to be seen by my doctor with telerounding then be directly seen by another doctor	79.5	13.9	50-100
Quality of telerounding conference survey for the patients			
1. How was the quality of the video?	73.0	12.6	50-90
2. How was the quality of the sound?	77.5	12.5	50-100

Patients gave scores between 0 and 100 for each question in the survey where 0 represents 'strongly disagree' and 100 'strongly agree'.

Table III. Outcomes of 'satisfaction' and 'quality of telerounding conference' surveys for the surgeon.

Questions of telerounding satisfaction survey for the surgeon	Mean	Standard deviation	Range
1. I feel that telerounding effected my patient's hospital care positively	73.0	13.4	40-90
2. I think that telerounding should be a regular part of patient care in the hospital	78.0	17.4	40-100
3. I could easily communicate with my patient using telerounding	77.0	18.9	40-100
4. If my patient was hospitalized again, I would feel comfortable with telerounding on an everyday basis	96.0	5.0	90-100
Quality of telerounding conference survey for the surgeon			
1. How was the quality of the video?	69.8	4.1	60-80
2. How was the quality of the sound?	80	5.6	70-100

Surgeon gave scores between 0 and 100 for each question in the survey where 0 represents 'strongly disagree' and 100 'strongly agree'.

(2-5) minutes respectively. Table I summarizes postoperative outcomes and characteristics of the patients followed with standard rounds (Group 1) and standard rounds plus video rounding system (Group 2). The VAS score evaluating the surgeon's satisfaction rate for telerounding was 91 ± 11.2 (60-100). Table II and Table III summarize the outcomes of 'satisfaction' and 'quality of telerounding conference' surveys for the patients and surgeon respectively. Patients expressed a high level of satisfaction with 72.5% of patients stating that their care was better using telerounding and 78% of patients stating that telerounding should be a regular part of patient care in the hospital. Additionally, 86% of the patients stated that they could easily communicate with their doctor over the telerounding system, 85.5% of patients agreed that they would feel comfortable with telerounding daily if they were hospitalized again and 79.5% of the patients would prefer telerounding communication with their doctor than be directly seen by another doctor. Seventy-three percent of the patients satisfied with the quality of video and 77.5% patients satisfied with the quality of sound during telerounding conference.

DISCUSSION

Advances in technology have opened new avenues for long-distance communication through telemedicine. Doctors could communicate with their patients even if long distance between the doctor and hospital; named as telerounding. It was firstly report-

ed by Ellison et al using a computer with a camera for telerounding installed on a remotely controlled custom service robot platform at 2004 with 85 patients (10). They emphasized that the patients in the telerounding arm demonstrated statistically substantial improvements in ratings of examination thoroughness, quality of discussions about medical information, postoperative care coordination, and attending physician availability.

A large multi-institutional randomized study by Ellison et al. included 270 patients; 134 in the robotic telerounding arm and 136 patients in bedside round arm, demonstrated high rates of patient satisfaction in telerounding arm in 2007 (11). Patients undergoing the following laparoscopic procedures were offered participation in this study: nephrectomy, partial nephrectomy, nephroureterectomy, retroperitoneal lymph node dissection, partial ureterectomy, and radical prostatectomy. Forty-five percent of the patients assessed that their care was better because of telerounding, 67% said that it should be a regular part of patient care in the hospital, 86% could easily communicate with their doctor using the telerounding system, 76%, if hospitalized again, would feel comfortable with telerounding, and 67% claimed that if their doctor was out of town they would rather teleround with their doctor than be seen by another doctor. There were no significant differences in hospitalization time and complication rates between the two arms.

Kau et al. evaluated the telerounding system by laptop computers with built-in webcam and video conferencing software in 2008 (12). Ten physician, 14 nurses and 10 patients were included in the study; 90% of patients agreed that they could easily communicate with their physician using video-rounding system (VRS). All patients strongly agreed that VRS should be a regular part of patient care and that they would be comfortable using VRS if their physician was unable to be in direct contact with them. All physicians and nurses agreed that VRS was easy to use, enhanced patient care, would be a comfortable alternative if direct physician contact was not possible, and that it should be a regular part of institutional care.

With the technological developments, the tablets had begun to be used for telerounding. Kaczmarek et al reported the first study with tablet telerounding in 2012 (13). Totally 32 postoperative patients (25 robotic partial nephrectomy, 2 radical nephrectomy, 3 robotic-assisted radical prostatectomy, 1 adrenalectomy and 1 nephroureterectomy) were evaluated in this study. Patients expressed a high level of satisfaction with 91% of patients stating that their care was better using telerounding and 97% of patients stating that telerounding should be a regular part of patient care in the hospital. Additionally, 94% of patients stated that they could easily communicate with their doctor over the telerounding system, 84% of patients agreed that they would feel comfortable with telerounding daily if they were hospitalized again and 81% of patients would prefer telerounding communication with their doctor than be directly seen by another doctor. Patients in our study also reported at least equivalent satisfaction rates with the responses to the similar questions. Postoperative outcomes were comparable between the two groups.

Our findings demonstrated high satisfaction rates for both the patients and the surgeon with telerounding system which was used in addition to routine bedside rounds. Previous similar studies included patients who underwent different operations, which could potentially cause a bias in evaluating postoperative satisfaction rates with the use of telerounding system. To the best of our knowledge, the recent study represents the first one which investigated the potential effect of telerounding system on postoperative outcomes, patient and surgeon satisfaction in patients who underwent the same endourological operation as standard (PNL) by the same surgeon. There are some limitations in our study. The main limitation is the relatively small sample size. This is because the study was designed as prospective and included the patients who underwent PNL by the same surgeon to standardize the outcomes. The survey is not validat-

ed. The way the questions are worded might be confusing for the patients as they received telerounding in addition to standard rounds and this might lead to recall bias. In the recent study we primarily aimed to investigate the possible additional effect of telerounding on patient and surgeon satisfaction without disturbing the routine clinical procedure. Therefore telerounding was performed by the primary surgeon as an additional round to standard bedside rounds. The patients might in actuality be satisfied with the increased availability of the primary surgeon and close interest due to additional telerounds as oppose to being satisfied by the concept of telerounding.

Our study included the patients who were postoperatively followed with routine bedside rounds and telerounding system plus bedside rounds. We designed the study in this way since in our opinion the lack of physical examination in a group of patients who were postoperatively followed with telerounding only might lead to serious morbidity. Further studies comparing the outcomes of the patients who are followed-up with standard rounds and telerounding only are required to support the findings of the present study.

CONCLUSIONS

Telerounding is an effective and feasible method to enhance surgeon-patient communication. The use of additional telerounding in urological patient care provides high satisfaction rates for both the patients and the surgeon. However the findings of the present study don't underestimate the importance of personal surgeon-patient interaction.

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