USC Norris Comprehensive Cancer Center
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# Wearable Fitness Trackers for Measurement of Behavioral Patterns Among Patients Undergoing Radical Cystectomy: A Pilot Study Assessing Feasibility and Utility

MP26-04

Madeleine L. Burg BA, Shane M. Pearce MD, Daniel E. Zainfeld MD, Saum Ghodoussipour MD, Ankeet Shah MD, Anne K. Schuckman MD, Hooman Djaladat MD MS, Siamak Daneshmand MD
USC Institute of Urology, USC/Norris Comprehensive Cancer Center, University of Southern California, Los Angeles, CA

## Background

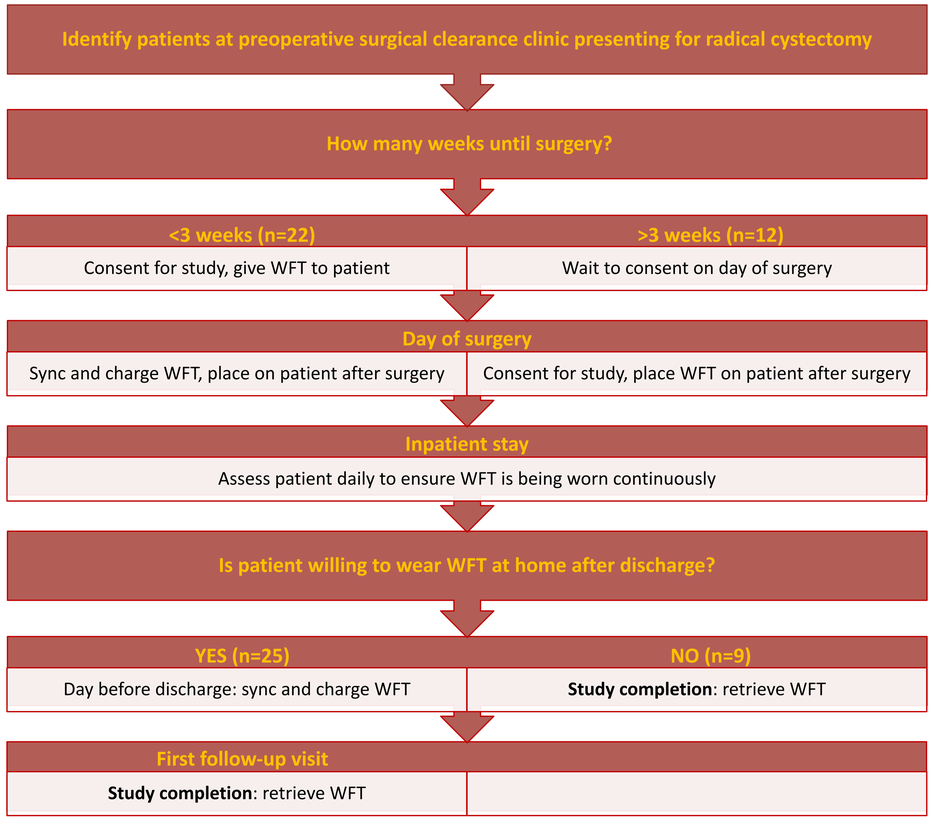
- Radical cystectomy is a complicated procedure associated with significant morbidity
- Postoperative recovery is greatly dependent on patients' functional status
- Wearable fitness trackers (WFT) offer a novel means of objectively evaluating patient behavioral patterns in the perioperative setting

## Materials and Methods

- Under IRB approval, 20 commercially available WFT (Fitbit® Alta HR™) were obtained
- Patients undergoing open or robotic radical cystectomy were consented and instructed on WFT use
- Patients used WFT for up to 3 weeks preoperatively, throughout inpatient stay, and up to 3 weeks postoperatively
- Devices automatically record activity levels and sleep patterns

- Activity includes: daily total steps, miles walked, calories burned, activity calories burned, minutes sedentary, and minutes active
- Sleep includes: time slept each day for cycles >1 hour and for each sleep cycle: minutes asleep and awake, number of awakenings, and minutes in bed

## Wearable Fitness Tracker Patient Timeline




## Results

| Overall Cohort | |
|---|---|
| Total patients enrolled | 34* |
| Age (median) | 74.0 years (56-83) |
| Male | 22 (68.8%) |
| BMI (median) | 25.0 (22.7-34.4) |
| Charlson Comorbidity Index (median) | 2 (2-3) |
| Robotic RC | 30 (33.0%) |
| Continent diversion | 14 (41.2%) |
| Discharge to skilled nursing facility (SNF) | 7 (21.9%) |

*Out of 34 patients enrolled, 32 consented to use of additional personal health information for study

| Median Days of Patient WFT Use | |
|---|---|
| Preoperative | 4.5 (0-6) |
| Inpatient | 3 (2-5) |
| Postoperative | 7 (1-8) |
| Total | 16 (11-22) |

| Daily Means of Sleep and Activity Variables | | | |
|---|---|---|---|
| **Variable** | **Preoperative** | **Inpatient** | **Postoperative** |
| Steps | 4,305 | 800 | 1,402 |
| Calories burned | 2,188 | 2,026 | 1,833 |
| Sedentary hours | 14.78 | 12.63 | 17.84 |
| Hours asleep | 4.97 | 6.82 | 4.70 |
| Awakenings per hour asleep | 1.98 | 0.90 | 1.43 |

## Results (*continued*)

- Exploratory analysis performed comparing WFT metrics by patient characteristics (age or diversion) and clinical outcomes
  - Age: <80 years old vs. ≥80 years old
  - Diversion type: non-continent vs. continent
  - Clinical outcomes
    - Delayed return of bowel function (>POD2)
    - Prolonged length of stay (LOS, >6 days)
    - Discharge disposition: home vs. SNF

| Exploratory Analysis Significant Findings | | |
|---|---|---|
| **Variable** | **Stratified by:** | **p-value** |
| Longest preoperative sleep cycle | Age | p=0.01 |
| Preoperative daily calories | Prolonged LOS | p=0.029 |
| Inpatient daily steps | Discharge disposition | p=0.033 |
| Inpatient daily calories | Discharge disposition | p=0.033 |

## Conclusions

- Use of WFT to objectively measure patients' activity and sleep is feasible in this patient population
- Perioperative activity level may predict length of stay after surgery and discharge disposition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