Establishment of the Seoul National University Prospectively Enrolled Registry for Genitourinary Cancer (SUPER-GUC): A prospective, multidisciplinary, bio-bank linked cohort and research platform

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Purpose: To establish a prospective, comprehensive, multidisciplinary, bio-bank linked genitourinary cancer cohort based on standard real practice.

Materials and Methods: We established the Seoul National University Prospectively Enrolled Registry for Genitourinary Cancer (SUPER-GUC), a prospective cohort clinical database and bio-specimen repository system for prostate cancer (SUPER-PC), renal cell carcinoma (SUPER-RCC), and urothelial cancer (SUPER-UC) at a high-volume, tertiary institution. Each cohort consists of several sub-cohorts based on treatment or disease status. Detailed longitudinal clinical information, and general and disease specific patient-reported outcomes are captured. We use the same evaluation format and questionnaires for all participating departments. Patients’ blood, urine, tumor, and normal tissues are collected. The number of registered patients and their basic characteristics are summarized. For the surgical sub-cohort, study participation, bio-specimen, and tissue banking rates are analyzed.

Results: Since March 2016, 11 sub-cohorts for all disease statuses have been opened, ranging from low-risk localized to metastatic disease. SUPER-PC, SUPER-RCC, and SUPER-UC enrolled 929, 796, and 1,221 patients, respectively. Study participation, biosampling, and fresh frozen tumor banking rates of surgical sub-cohorts were 89.0% to 93.1%, 91.2% to 99.1%, and 56.9% to 79.1%, respectively.

Conclusions: SUPER-GUC is a study platform for comparative outcome, quality-of-life, and translational (genetics, biomarkers) research for genitourinary cancer.

Keywords: Biological specimen banks; Cohort studies; Prospective studies; Urogenital neoplasms

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ⓒ The Korean Urological Association
INTRODUCTION

Genitourinary cancers are commonly diagnosed malignancies worldwide and significantly impact human health. Prostate cancer (PC) is the most commonly diagnosed malignancy in men in the United States and second most frequent cancer in men worldwide in 2018 [1,2]. Bladder and kidney cancers are globally the sixth and ninth most common cancers, respectively, in men [1]. European countries have the highest incidence of these all three genitourinary cancers [1,3]. Furthermore, the incidence and mortality of these three genitourinary cancers have increased 2.5- and 1.6-fold between 1990 and 2013, respectively [4]. This substantial increasing trend of global genitourinary cancer burden has not subsided.

While randomized controlled trials (RCTs) provide the highest level of evidence, they are not always feasible and sometimes impossible [5]. Narrow eligibility criteria and highly controlled settings of RCTs can rather limit their applicability [5]. Alternatively, high-quality cohort studies sometimes generate valuable information that is generally applicable, even in situations in which RCT is impractical [6].

Accordingly, we aimed to develop a prospective, comprehensive, multidisciplinary, bio­bank­linked cohort based on standard real practice for PC, renal cell carcinoma (RCC), and urothelial cancer (UC). After preparing for three years, we established the Seoul National University Prospectively Enrolled Registry for Genitourinary Cancer (SUPER-GUC) in March 2016. The major goals of the SUPER-GUC are as follows: 1) to conduct comparative outcome studies between various treatment options, 2) to identify prognostic factors for disease progression and mortality, 3) to facilitate various type of translational research including genetic or molecular profiling and biomarker studies, 4) to understand patients’ quality of life (QoL) and promote QoL research including a patient-oriented outcome study and comparative-effectiveness research [7], 5) to investigate changes in body composition and its impacts on outcomes, and 6) to understand the influence of aging and fragility on treatment and cancer in elderly patients.

The present paper describes the design and methodology of SUPER-GUC. Furthermore, we summarize current patient enrollment status and basic demographics.

MATERIALS AND METHODS

1. Ethics statement

All study protocols for SUPER-PC, SUPER-RCC, and SUPER-UC were approved by the Institutional Review Board (IRB) of Seoul National University Hospital (Seoul, Korea). The approval numbers are H-1506-121-682, H-1506-120-682, and H-1506-122-682, respectively. Informed consent was obtained by all subjects when they were enrolled.

2. Organization

As faculty providing direct treatment, four uro-oncologists, two medical oncologists, and one radiation oncologist, who mainly manage treat genitourinary cancer patients, participate with this cohort. They exclusively manage almost all genitourinary cancer patients in our tertiary high-volume institution. As supporting faculty, three uro-radiologists, one nuclear medicine physician, and one uro-pathologist exclusively interpret medical images and pathological results. Participating faculty are all well-experienced, dedicated specialists in their field. We have one permanent information technology (IT) engineer consultant and three IT advisors.

3. Sub-cohorts and eligibility criteria

SUPER-GUC consists of three cohorts based on cancer type, SUPER-PC, SUPER-RCC, and SUPER-UC. Each cohort is composed of several subcohorts based on treatment or disease status. Names of the subcohorts and their eligibility criteria are described in Table 1.

4. Patient process, data collection, and bio-specimen repository

In principle, the cohort is based on real clinical practice, and the study does not interfere with actual practice. All patients are enrolled following provision of written informed consent for the cohort study based on cancer type as well as for the additional bio-specimen registry.

All data were collected using the Research Electronic Data Capture (REDCap) system in an independent server with a triple back-up system. REDCap is a secure, web-based application designed to support data capture for research studies [8]. Electronic case-report forms (eCRF) consist of several forms (designated as ‘instruments’ in REDCap), and selected forms can be repeatedly entered to capture longitudinal data. Furthermore, some common forms are shared by all subcohorts in SUPER-GUC. We categorized data entering forms as once entering, repeatedly entering, and revisingly entering forms. After entering all data in once entering type form, it is finalized and locked. We can handle repeating data using repeatedly entering forms, such as questionnaires or transurethral resection of bladder tumor information. In revisingly entering forms, we can revise data until it is finalized. For instance, the last follow-
Table 1. Sub-cohorts of the SUPER-GUC and their eligibility criteria

| Cohort            | Eligibility criteria                                                                 |
|-------------------|---------------------------------------------------------------------------------------|
| SUPER-PC          | Pathologically proven prostate cancer patients who underwent radical prostatectomy     |
| SUPER-PC-RP       | Pathologically proven low risk prostate cancer patients within 6 months who undergo active surveillance as initial treatment. They should be eligible by strict criteria registered in ClinicalTrials.gov protocol (NCT02971085), when patients want and meet usual active surveillance criteria they can be enrolled as non-strict criteria. |
| SUPER-PC-RT       | Pathologically proven prostate cancer patients who underwent radiotherapy with curative intent. It includes primary, adjuvant and salvage radiotherapy, but palliative radiotherapy is not eligible. |
| SUPER-PC-HSPC     | Pathologically proven non-metastatic or metastatic hormone sensitive prostate cancer patients who undergo medical therapy as major initial treatment. It includes watchful waiting, ADT, and ADT. Neoadjuvant and/or adjuvant medical therapy for other major treatment is not eligible. |
| SUPER-PC-CRPC     | Pathologically proven prostate cancer patients, who were progressed as CRPC within 3 months. |
| SUPER-RCC         | Clinically diagnosed as renal cell carcinoma patients who undergo surgical treatment. It includes ablation, partial or radical nephrectomy. It is not limited to localized cancer, thus nocturnal nephrectomy in metastatic disease is also eligible. |
| SUPER-RCC-Nx      | Clinically diagnosed as renal cell carcinoma patients who undergo surgical treatment. It includes nephroureterectomy, segmental ureterectomy and any kind of nephron sparing endoscopic treatment. It also includes definitive treatment plan after intraoperative decision by ureteroscopy with or without frozen biopsy. |
| SUPER-RCC-mRCC    | Pathologically proven renal cell carcinoma patients who were diagnosed as advanced (T4 or N1) or metastatic disease within 3 months and underwent initial treatment for advanced or metastatic RCC. Nephrectomy or metastasectomy before pathologic diagnosis does not limit the enrollment. |
| SUPER-UC          |                                                                                       |
| SUPER-UC-TURB     | Clinically diagnosed as bladder cancer patients who underwent transurethral resection of bladder tumor. |
| SUPER-UC-Cx       | Pathologically proven bladder cancer patients who underwent radical cystectomy.         |
| SUPER-UC-UTUC     | Clinically diagnosed as upper urinary tract urothelial cancer patients who undergo curative surgical treatment for it. It includes nephroureterectomy, segmental ureterectomy and any kind of nephron sparing endoscopic treatment. It also includes definitive treatment plan after intraoperative decision by ureteroscopy with or without frozen biopsy. |
| SUPER-UC-mUC      | Pathologically proven urothelial cancer patients who were diagnosed as advanced (non-localized or lymph node involvement) or metastatic disease within 3 months and underwent initial treatment for advanced or metastatic urothelial cancer. |

Cohort Eligibility criteria

SUPER-PC-RP Pathologically proven low risk prostate cancer patients within 6 months who undergo active surveillance as initial treatment. They should be eligible by strict criteria registered in ClinicalTrials.gov protocol (NCT02971085), when patients want and meet usual active surveillance criteria they can be enrolled as non-strict criteria.

SUPER-PC-RT Pathologically proven prostate cancer patients who underwent radiotherapy with curative intent. It includes primary, adjuvant and salvage radiotherapy, but palliative radiotherapy is not eligible.

SUPER-PC-HSPC Pathologically proven non-metastatic or metastatic hormone sensitive prostate cancer patients who undergo medical therapy as major initial treatment. It includes watchful waiting, ADT and chemo-ADT. Neoadjuvant or adjuvant medical therapy for other major treatment is not eligible.

SUPER-PC-CRPC Pathologically proven prostate cancer patients, who were progressed as CRPC within 3 months.

SUPER-RCC Clinically diagnosed as renal cell carcinoma patients who undergo surgical treatment. It includes ablation, partial or radical nephrectomy. It is not limited to localized cancer, thus nocturnal nephrectomy in metastatic disease is also eligible.

SUPER-RCC-Nx Clinically diagnosed as renal cell carcinoma patients who undergo surgical treatment. It includes nephroureterectomy, segmental ureterectomy and any kind of nephron sparing endoscopic treatment. It also includes definitive treatment plan after intraoperative decision by ureteroscopy with or without frozen biopsy.

SUPER-RCC-mRCC Pathologically proven renal cell carcinoma patients who were diagnosed as advanced (T4 or N1) or metastatic disease within 3 months and undergone initial treatment for advanced or metastatic RCC. Nephrectomy or metastasectomy before pathologic diagnosis does not limit the enrollment.

SUPER-UC Clinically diagnosed as bladder cancer patients who underwent transurethral resection of bladder tumor.

SUPER-UC-Cx Pathologically proven bladder cancer patients who underwent radical cystectomy.

SUPER-UC-UTUC Clinically diagnosed as upper urinary tract urothelial cancer patients who undergo curative surgical treatment for it. It includes nephroureterectomy, segmental ureterectomy and any kind of nephron sparing endoscopic treatment. It also includes definitive treatment plan after intraoperative decision by ureteroscopy with or without frozen biopsy.

SUPER-UC-mUC Pathologically proven urothelial cancer patients who were diagnosed as advanced (non-localized or lymph node involvement) or metastatic disease within 3 months and underwent initial treatment for advanced or metastatic urothelial cancer.

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We collect patients’ pre-treatment whole blood, serum, buffy coat, plasma, and urine samples at the time of entering new sub-cohorts. Collected samples are divided in microvials and stored in a -80ºC deep freezer or -195ºC liquid nitrogen container according to the sample type at the Seoul National University Hospital Human Biobank. Tumor and normal tissues are collected in the operating room or frozen biopsy room up to six vials each and immediately stored in a -195ºC liquid nitrogen tank at the Seoul National University Hospital Cancer Tissue Bank. These two banking systems are qualified, centralized bio-banking systems at our institution that have been in operation for almost a decade. Formalin-fixed, paraffin-embedded tissue blocks are available in virtually 100% patients managed by the Department of Pathology.

5. Outcome measurements

A major point of interest regarding the cohort is oncologic outcomes. Baseline cancer status and general condition are evaluated at the time of enrollment for each sub-cohort. Treatment response, time of recurrence, and survival are evaluated. Furthermore, baseline cancer status and oncologic outcome are repeatedly evaluated for every single major treatment in advanced or metastatic disease. Date and cause of death are confirmed by regular linkage with death registry at the Statistics Korea.

Functional outcomes measured in PC patients include urinary and sexual function. For the nephrectomy sub-cohort, renal function was also determined using estimated glomerular filtration rate or renal scan and progression to end-stage renal disease.

6. Statistical analysis

We summarize current enrollment status, basic demographics, and sampling information. Data are expressed as the mean±standard deviation. A p-values <0.05 were considered statistically significant. All statistical analyses were performed using R for Windows, version 3.5.1 (http://www.r-project.org).

RESULTS

The first patient was enrolled March 7, 2016 in SUPER-PC. At the end of December, 2018, a total of 929, 796, and 1,221 patients were enrolled in SUPER-PC, SUPER-RCC, and SUPER-UC, respectively. Results of patient enrollment

| Name of form | Number of fields | Entering type | Description and examples |
|--------------|-----------------|---------------|--------------------------|
| Study data & demographics | 39 | Once entering | Study number, basic demographics and bio-banking information |
| Preop. characteristics | 54 | Once entering | Initial PSA, biopsy information, past medical, social and family history |
| Preop. imaging | 19 | Once entering | Results of magnetic resonance imaging and bone scan |
| Operation | 38 | Once entering | Details of surgery |
| Pathology | 50 | Once entering | Final pathology details |
| Postop. outcomes | 9 | Once entering | Short-term postoperative results such as duration of hospital stay, cystography and Foley catheter removal date |
| Complication | 31 | Once entering | Intraoperative, immediate, 30 and 90 days complications |
| Lab | 35 | Repeatedly entering | Laboratory results (except PSA) |
| PSA | 202 | Revisingly entering | PSA results |
| Medication & comorbidity | 22 | Repeatedly entering | Information of medication and comorbidity |
| A/E | 62 | Repeatedly entering | Post-treatment adverse events |
| IPSS | 14 | Repeatedly entering | International Prostate Symptom Score questionnaire |
| EPIC-CP | 26 | Repeatedly entering | Expanded Prostate Cancer Index Composite for Clinical Practice questionnaire |
| IIEF-5 | 9 | Repeatedly entering | International Index of Erectile Function-5 questionnaire |
| EQ-SD-SL | 10 | Repeatedly entering | EuroQol health-related utility measurement tool |
| CARE questionnaire | 35 | Repeatedly entering | Convalescence And Recovery Evaluation questionnaire |
| G8 | 10 | Once entering | Geriatric assessment by the G8 |
| InBody | 26 | Repeatedly entering | Body composition measurement by bio-electrical impedance analysis |
| Functional outcome summary | 30 | Revisingly entering | Summarized results of continence and potency |
| Oncologic outcome summary | 63 | Revisingly entering | Adjuvant or salvage treatment and oncologic outcome results |

Preop., preoperative; postop., postoperative; PSA, prostate-specific antigen.
DISCUSSION

There are several types of prospective cohort or registries [19]. Population-based cohorts systematically collect data on all or randomly selected patients with a certain disease in a given geographic area within a given time [20]. They usually link with national claims data and statistics [21]. Thus, representativeness and generalizability are the advantage, while incomplete or inaccurate data coding and lack of detailed information are potential serious pitfalls [21]. Community and/or multicenter cohorts may be the most common form of cohorts [19]. A greater number of involved institutions increases the generalizability. However, relatively high cost, standardization between

Table 3. Patient enrollment status of Seoul National University Prospectively Enrolled Registry for Genitourinary Cancer (SUPER-GUC) at the end of December, 2018

| Cohort          | First enrollment date | Number of patients |
|-----------------|-----------------------|--------------------|
| SUPER-PC        |                       | 929                |
| SUPER-PC-RP     | March 6, 2016         | 765                |
| SUPER-PC-AS     | December 23, 2016     | 56                 |
| SUPER-PC-RT     | May 20, 2016          | 39                 |
| SUPER-PC-HSPC   | October 18, 2016      | 56                 |
| SUPER-PC-CRPC   | April 3, 2017         | 13                 |
| SUPER-RCC       |                       | 796                |
| SUPER-RCC-Nx    | March 10, 2016        | 762                |
| SUPER-RCC-mRCC  | June 2, 2016          | 34                 |
| SUPER-UC        |                       | 1,221              |
| SUPER-UC-TURB   | March 21, 2016        | 859                |
| SUPER-UC-Cx     | March 21, 2016        | 170                |
| SUPER-UC-UTUC   | March 7, 2016         | 163                |
| SUPER-UC-mUC    | March 28, 2016        | 29                 |

SUPER, Seoul National University Prospectively Enrolled Registry; PC, prostate cancer; RP, radical prostatectomy; AS, active surveillance; RT, radiation therapy; HSPC, hormone-sensitive prostate cancer; CRPC, castration-resistant prostate cancer; RCC, renal cell carcinoma; Nx, nephrectomy; mRCC, metastatic renal cell carcinoma; UC, urothelial cancer; TURB, transurethral resection of bladder tumor; Cx, cystectomy; UTUC, upper urinary tract urothelial cancer; mUC, metastatic urothelial cancer.
institutions, and maintaining high quality are ongoing challenges. Single institutional cohort may be limited by its lack of representativeness; however, it has the advantage of being able to collect additional detailed information [19]. Furthermore, it is relatively easy to maintain high quality.

Traditionally, numerous studies were conducted as retrospective single center case series, rather than an actual cohort [6,19,22]. Occasionally, the reports insisted they used a prospectively collected database, but they were usually limited by many biases and missing data. Thus, we initiated SUPER-GUC as a prospective, single institutional cohort with flexible structure; this can be extended as multicenter cohort in the future. Additionally, although we started it as a single institutional cohort, we endeavored to overcome limitation of single-center cohort and maximize its quality and potential for utilization.

First, we organized it as multidisciplinary cohort, which collects data from all related departments using standardized methods. We also unified data collection forms and timing, especially QoL questionnaires and adverse events assessment. Patients can select different treatment provided by different specialties, even for the same disease status. For example, localized PC patients may undergo either RP provided by a urologist or radiation therapy provided by a radiation oncologist [23]. Furthermore, patients may have sequential treatments through different departments dependent upon disease progression. For instance, after radical cystectomy performed by a urologist, adjuvant or palliative chemotherapy can be provided by a medical oncologist. Based on this multidisciplinary endeavor, we can compare any treatment outcome as well as that of any follow-up evaluation throughout long-term treatment without cessation.

Next, we constructed a comprehensive cohort consisting of sub-cohorts for all possible disease conditions and treatments. Patients may be entered to a specific sub-cohort from other sub-cohorts dependent upon disease progression; alternatively, newly referred patients may be enrolled

| Characteristic | SUPER-PC-RP | SUPER-RCC-Nx | SUPER-UC-TURB | SUPER-UC-Cx | SUPER-UC-UTUC |
|----------------|-------------|--------------|--------------|-------------|---------------|
| No. of patients enrolled | 765 | 762 | 859 | 170 | 163 |
| Participation rate\(a\) | 765/836 (91.5) | 762/853 (89.3) | 859/964 (89.1) | 170/191 (89.0) | 163/175 (93.1) |
| Bio-specimen sampling rate | 758/765 (99.1) | 733/762 (96.2) | 829/859 (96.5) | 155/170 (91.2) | 155/163 (95.1) |
| Tumor banking | 463/765 (60.5) | 565/762 (74.1) | 489/859 (56.9) | 117/170 (68.8) | 129/163 (79.1) |
| Baseline characteristics | | | | | |
| Age (y) | 68.7±6.6 | 59.4±12.4 | 68.9±11.9 | 67.0±10.9 | 68.5±9.9 |
| Sex | | | | | |
| Male | 765 (100.0) | 521 (68.4) | 687 (80.0) | 128 (75.3) | 113 (69.3) |
| Female | 0 (0.0) | 241 (31.6) | 172 (20.0) | 42 (24.7) | 50 (30.7) |
| Clinical T stage | | | | | |
| ≤T1 | 674 (88.1) | 658 (86.4) | 568 (66.1) | 59 (34.7) | 123 (75.5) |
| T2 | 79 (10.3) | 63 (8.3) | 86 (10.0)* | 88 (51.8) | 17 (10.4) |
| T3 | 12 (1.6) | 38 (5.0) | - | 15 (8.8) | 22 (13.5) |
| T4 | 0 (0.0) | 3 (0.4) | - | 8 (4.7) | 1 (0.6) |
| Tx | 0 (0.0) | 0 (0.0) | 205 (23.9)* | 0 (0.0) | 0 (0.0) |
| Clinical N stage | | | | | |
| N0 | 672 (87.8) | 738 (96.9) | - | 145 (85.3) | 145 (89.0) |
| N+ | 86 (11.2) | 24 (3.1) | - | 25 (14.7) | 18 (11.0) |
| Nx | 7 (0.9) | 0 (0.0) | - | 0 (0.0) | 0 (0.0) |
| Clinical M stage | | | | | |
| M0 | 738 (96.5) | 738 (96.9) | - | 169 (99.4) | 162 (99.4) |
| M+ | 0 (0.0) | 24 (3.1) | - | 1 (0.6) | 1 (0.6) |
| Mx | 27 (3.5) | 0 (0.0) | - | 0 (0.0) | 0 (0.0) |

Values are presented as number only, number/total number (%), mean±standard deviation, or number (%). SUPER, Seoul National University Prospectively Enrolled Registry; GUC, Genitourinary Cancer; PC, prostate cancer; RP, radical prostatectomy; RCC, renal cell carcinoma; Nx, nephrectomy; UC, urothelial cancer; TURB, transurethral resection of bladder tumor; Cx, cystectomy; UTUC, upper urinary tract urothelial cancer.

\(a\):Percentage of patients enrolled among all eligible patients, \(b\):pathologic stage of first TURB after enrolled, \(c\):pathologic stage ≥T2, \(d\):pathologic T0 or benign.
directly to the sub-cohort. This sub-cohort structure allows us to effectively recruit patients, especially those with a more advanced condition, and collect specific detailed data focusing on the status of each patient. The Cancer of the Prostate Strategic Urologic Research Endeavor (CaPSURE) is one of the most successful prospective PC cohorts [19,24]. This cohort recruited over 15,000 patients at all stages from 43 urology practices for three decades [19,24,25]. However, only newly diagnosed PC patients are eligible in a single-phase design [24,25]. Therefore, localized cancer and initial treatment are highly focused, whereas data after progression or later phase treatment (e.g., androgen receptor-targeted treatment for castration-resistant PC) are limited. We expect we can overcome this using our comprehensive, multi-sub-cohort design.

Third, the bio-specimen repository is another important feature of SUPER-GUC. Traditionally, all formalin-fixed, paraffin-embedded tissue blocks of surgical specimens are stored in our institution. However, we extend this by collecting pre-treatment blood and urine in most cases and freshly frozen tumor and normal tissues in all possible cases. These bio-specimens are stored and managed by qualified, centralized bio-banking systems that are certified by the government. Thus, SUPER-GUC can support a variety of translational research, such as biomarker or genetic profiling studies. For instance, we are currently conducting a study to evaluate the association between congenital immune deficiency with cancer characteristics and outcomes in 540 bladder cancer patients. Several urine biomarker studies for bladder cancer were conducted or are currently in progress. We also performed comprehensive genetic characterization of transcription factor E3 (TFE3) overexpressed RCC using the SUPER-RCC cohort. Recently, we conducted a predictive serum biomarker study that differentiates benign tumors from RCC using SUPER-RCC-Nephrectomy (Nx). We are cautiously confident that SUPER-GUC will be an important translational research platform.

Fourth, even though it is institutional cohort, mortality information is regularly collected from the government death registry at the Statistics Korea. Accordingly, we can assure survival data, the most important outcome of SUPER-GUC.

Finally, we collect a variety of data for comprehensive future studies. Using validated instruments, patient-reported health-related QoL are evaluated. Since usual health-related QoL questionnaires cannot sensitively capture differences in QoL between surgery types, we also collect CARE questionnaire before and within 3 months after operation [9].
To evaluate the effect of vulnerability, we also use the G8 geriatric screening tool for elderly patients for all treatments [10,11]. Moreover, to more precisely measure muscle and fat mass and determine their association with outcome, we regularly measure body composition using BIA [14-16].

SUPER-GUC also has several limitations. Since it is a single-center cohort, it is difficult to enroll a large patient number and difficult to represent whole population. However, its flexible design and open structure can exped SUPER-GUC for multi-center collaboration. Actually, SUPER-PC-Active Surveillance (AS) is being adapted for a nationwide, multicenter cohort of the Korean Urological Oncology Society by reducing variables and restructuring the eCrf. Because non-surgical sub-cohorts were opened later, numbers of patients in these sub-cohorts are relatively small. An outpatient-based patient recruiting system has been recently established. Therefore, we expect a rapid increase in the size of non-surgical sub-cohorts. Furthermore, although inherent bias from an observational study is inevitable, it may be minimized using a recent statistical adjusting methodology [6:26:27].

There are many prospective cohorts in the uro-oncology field; however, they are for specific cancer types and are generally limited to specific disease conditions or treatments [19,24,28-30]. To our knowledge, SUPER-GUC is the first comprehensive, prospective, bio-bank-linked cohort covering all major genitourinary cancers for all disease statuses and treatments.

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