**Online supplement**

**Material and methods**

*US Nationwide Inpatient Sample (NIS)*

The NIS data is coded using the ICD-9 coding system. Thus, codes of interest for our investigations were the diagnosis of carcinoma of the bladder, urethra or not otherwise specified urinary organs (ICD-9: 188 or 1893 or 1898 or 1899) combined with ICD-PCS-codes 5771 or 5779 (radical cystectomy) or 688 (anterior pelvic exenteration). UD was grouped as continent (PCS codes 5787 - orthotopic pouch, neobladder) or incontinent (5651 - ileal conduit, 5661 - ureterocutaneostomy, 5671 - urinary diversion to intestine) in accordance with the existing literature [[29](#_ENREF_29)]. Cases without a procedure code for UD were added to the incontinent group. Further the PCS-codes9900, 9902, 9903 or 9904 (transfusion of packed red blood cells) were included. The surgical approach was defined as laparoscopic radical cystectomy (LRC) with PCS-codes 5421 and not 1742, robot-assisted radical cystectomy (RARC) using PCS-code 1742 and open RC (ORC) for the remaining cases without additional codes.

Demographic and institutional data such as age, gender, hospital size, location and teaching status were applied as covariates. Absolute caseload numbers, mortality, rates for packed red blood cell transfusion and the LOS were calculated and stratified for relevant factors including the surgical approach and the annual hospital caseload.

Because of the redesign of the NIS in the year 2012 switching from a sample of hospitals to a sample of cases from the participating hospitals, caseload category related analyses were not possible for the years 2012 to 2014. Therefore, our investigations involving hospital caseload categories are restricted to the years 2006 to 2011.

*German billing database*

Germany uses the G-DRG reimbursement system with ICD-10 (International Classification of Disease Modification 10) coded diagnosis and OPS (“Operationen und Prozedurenschluessel” - German version of the international classification of procedures in medicine) coded procedures. German hospitals are obliged to transfer their billing data annually to the Institute for hospital remuneration (InEK). For the given purpose this data is virtually complete, since the only excluded facilities cover exclusively psychiatry and forensic or military hospitals not treating civilians. After the reimbursement process the data is stored at the Federal Statistical Office for scientific use. Identification of single cases or hospitals is censored because of German data protection regulations and retraceable results will be censored. Likewise, the raw data is not available for scientific purposes and analyses may only be done by remote data processing.

Inclusion criteria were the diagnosis of bladder cancer (ICD-10: C.67) or a not otherwise specified urothelial carcinoma (C.68) in combination with RC (5-576) or an anterior pelvic exenteration (5-687). UD was defined as either continent (procedure codes 5-566 - continent pouch, 5-577 - orthotopic pouch; neobladder) or incontinent (procedure codes 5-564 – ureterocutaneostomy - 5-565 - ileal conduit, 5-567 - ureterosigmoideostomy). The surgical approach was grouped as LRC (PCS-codes 5-576.01 – 5-576.x1), RARC (PCS-code 5-987) or ORC for the remaining cases without additional codes. blood transfusion was determined by using PCS code 8800c (transfusion of packed red blood cells). Age and gender could be extracted as covariate factors while additional institutional characteristic data (i.e. teaching status, hospital size, and hospital location) had to be compiled to the existing billing data records by using the institute identification number. For the DRG-database hospital size was defined as small (<300 beds), medium (300-800 beds), and large (>800 beds) while an urban surrounding of the hospital was defined as <20,000 inhabitants. The respective variables in the NIS are categorized by a complex algorithm including the type of hospital and the local region with varying absolute numbers.

We followed the "REporting of studies Conducted using Observational Routinely collected health Data" statement.