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# Supplementary Table 1: Description of the included patients in studies of biopsy-related infections

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| Reference | Description of included patients |
| Davison et al 1971 [[18](#_ENREF_18)] | **Country:** USA**Type of infectious complication:** Fever >37.8oC**Definition of infection:** Patients with fever (oral temperature >37.8 oC) following transrectal biopsy**Definition of positive urine culture:** Not defined.**Timing and number (per patient) of blood cultures:** Unclear**Rate of infection:** 27.4% (31 of 113)**Timing of presentation after biopsy:** Not reported.**Lower urinary tract symptoms:** Not reported**Laboratory finding:** Not reported **Discordance in microbiological isolates in cases with both urine and blood cultures available**: Not clarified (n=3 with both cultures positive) |
| Sieber 1997 [[27](#_ENREF_27)] | **Country:** USA**Type of infectious complication:** Febrile UTI (>38.3oC).**Definition of infection:** Urinary tract infection was defined as 1) simple-positive urine culture without systemic symptoms, and 2) complicated-positive urine and/or blood culture, and temperature >38.3oC. Only the latter was considered for this review.**Definition of positive urine culture:** Not defined.**Timing and number (per patients) of blood cultures:** Unclear**Rate of infection:** 0,1% (3 of 4439)**Timing of presentation after biopsy:** 2 presented the next day and 1 presented at day 4 after biopsy.**Lower urinary tract symptoms:** Not reported**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/2 |
| Tal et al 2003 [[20](#_ENREF_20)] | **Country:** Israel**Type of infectious complication:** Febrile (>38oC) UTIs**Definition of infection:** Patients with complaints suggestive of urinary tract infection within 10 days after transrectal ultrasound guided prostate biopsy. Clinical suspicion for urinary tract infection was based on a body temperature of greater than 38oC and leukocytes in the urine sediment at hospital admission. **Definition of positive urine culture:** Not defined.**Rate of infection:** Not reported.**Timing of presentation after biopsy:** Mean 2.2 days, range 0 to 7 days, 95% confidence interval 1.5-3 days.**Timing and number (per patient) of blood cultures:** Unclear**Lower urinary tract symptoms:** Unclear among the febrile patients.**Clinical presentations:** Of the 23 included patients: 18 presented with chills, 4 had signs of orchiepididymitis, 13 had pyuria.**Laboratory finding:** Not reported**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/4 |
| Otrock et al 2004 [[46](#_ENREF_46)] | **Country:** Lebanon**Type of infectious complication:** Febrile (>38oC) UTI**Definition of infection:** Urinary tract infection was defined as the presence of at least two of the following: urinary symptoms (dysuria, frequency, urgency, and suprapubic pain), pyuria (>6/mm3 of urine), leukocytosis (>10,000/mm3 with more than 60% polymorphonuclear leukocytes), and fever (oral temperature exceeding 38°C). **Definition of positive urine cultures:** Not defined.**Rate of infection:** 6.3% (13/207)**Timing of presentation after biopsy:** Symptoms appeared at a mean of 2.7 days following transrectal ultrasound guided needle biopsy (range, 1 to 10 days).**Timing and number (per patient) of blood cultures:** two sets of blood cultures (15 minutes apart) were performed before starting treatment.**Lower urinary tract symptoms:** Urinary symptoms were present in 12 patients (92.3%). **Laboratory findings:** Pyuria was present in 11 (84.6%). Leukocytosis was found in 7 (53.8%). Pyuria was absent in 2 of the 5 patients with negative urine cultures (all patients with a positive urine culture had pyuria). Leukocytosis was absent in 5 of the 7 patients with negative blood cultures (5 of 6 patients with a positive blood culture had leukocytosis)**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/4**Rectal cleansing/disinfection**: UTI developed in 5 (8.2%) of 61 patients who received enemas and in 8 (5.5%) of 146 patients who did not (P = .46). However, the data was insufficient to calculate the discordance in the two groups.  |
| Huang 2006 [[54](#_ENREF_54)] | **Country:** Taiwan**Type of infectious complication:** Fever> 37.7oC**Definition of infection:** Infection was defined as an oral temperature of more than 37.7°C or any chills that developed after the prostate biopsy.**Definition of positive urine cultures:** Not defined.**Rate of infection:** 2.7% (6/222)**Timing and number (per patient) of blood cultures:** Unclear**Timing of presentation after biopsy:** Not reported.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** 4 patients had pyuria (>5 white blood cells per high power field). 3 patients had leukocytosis (>10000/mm3). 3 of the 4 patients with bacteremia had leukocytosis (the other patients had leukopenia). The dipstick nitrite test was positive in 4 patients but only 1 had a positive urine culture. **Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/1**Rectal cleansing/disinfection method:** self-administered phosphate enema (n=65), phosphate enema combined with povidone-iodine administered by a doctor at the hospital (n=157). All cases of infectious complications occurred in the first group (self-administered phosphate enema). |
| Shigehara 2008 [[28](#_ENREF_28)] | **Country:** Japan**Type of infectious complication:** Acute prostatitis (with fever>38oC). **Definition of infection:** “Patients with acute prostatitis occurring within 7 days after biopsy were enrolled in this study. The clinical diagnosis of acute prostatitis was based on a body temperature greater than 38°C, leukocytes in the urine sediment, and clinical findings on digital rectal examination.”**Definition of positive urine culture:** Not defined.**Rate of infection:** 1.3% (6/457)**Timing and number (per patient) of blood cultures:** Bacterial evaluation, including aerobic urine culture and both aerobic and anaerobic blood cultures, was performed before antibiotic treatment was initiated.**Timing of presentation after biopsy:** “The interval until symptoms of acute prostatitis appeared ranged from 10 to 18 h (median, 14.3 h)”.**Lower urinary tract symptoms:** Not reported.**Llaboratory findings:** By design all patients had pyuria.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/3 |
| Tuncel 2008 [[55](#_ENREF_55)] | **Country:** Turkey**Type of infectious complication:** Fever>38oC. The patients without fever were not considered for this review.**Definition of infection:** Patients with high fever (>38oC) and patients with irritative voiding symptoms lasting longer than 3 days in addition to any bacterial growth. All patients with fever had blood cultures taken. For this review we only considered the patients presenting with fever.**Definition of positive urine culture:** Unclear. A cut-off of >105 CFU/ml was used to define asymptomatic bacteriuria.**Rate of infection:** 8.1% (16/198)**Timing and number (per patient) of blood cultures:** unclear**Timing of presentation after biopsy:** Not reported.**Lower urinary tract symptoms:** Unclear among febrile patients.**laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**:No cases. |
| Ozden 2009 [[33](#_ENREF_33)] | **Country:** Turkey**Type of infectious complication:** Acute prostatitis (all with fever>38oC)**Definition of infection:** Patients with acute prostatitis occurring within 7 days after biopsy were reviewed. The clinical diagnosis of acute prostatitis was determined by a body temperature >38°C, leukocytes in the urine sediment, and clinical findings on digital rectal examination.**Definition of positive urine culture:** Not defined.**Rate of infection:** 2.1% (28/1339)**Timing and number of blood cultures:**  Cultures were obtained before initiation of treatments. The number of blood cultures obtained per patient was not reported.**Timing of presentation after biopsy:** Mean time to onset of symptoms= 3 days.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:**  n=18 (64%) had leukocytosis (>10 000 cells/μL)**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/2 |
| Lange 2009 [[19](#_ENREF_19)] | **Country:** Canada**Type of infectious complication:** Urosepsis.**Definition of infection:** Patients presenting with urosepsis (not defined).**Definition of positive urine culture:** Not defined.**Rate of infection:** 0.5% (24/4794)**Timing and number of blood cultures:** Unclear**Timing of presentation after biopsy:** Median time to presentation= 1 day (range 0-9 days).**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Mean leukocyte count at presentation was 11.000 /μL.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 9/10 (In all but 1 patient with both positive blood and urine cultures, E. coli was isolated from both specimens. In 1 unusual case, the patient harbored mixed S. viridans in blood, as well as E. coli in both the blood and urine.) |
| Hori 2010 [[47](#_ENREF_47)] | **Country:** UK**Type of infectious complication:** Sepsis (all with fever>38oCand rigors)**Definition of infection:** Biopsy within 2 weeks + fever (>38oC) + other non-urologic causes excluded + presenting with rigors + lower urinary tract symptoms (dysuria, frequency, urgency, suprapubic pain) + 2 or more SIRS criteria.**Definition of positive urine culture:** Not defined.**Rate of infection:** 4.6% (10/219)**Timing and number of blood cultures:** Not clarified.**Timing of presentation from biopsy:** Not reported**Lower urinary tract symptoms:** By definition, all patients.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**:No cases |
| Hedelin 2011 [[21](#_ENREF_21)] | **Country:** Sweden**Type of infectious complication:** Fever**Definition of infection:** Patients hospitalized due to fever within 3 weeks after a prostate biopsy.**Definition of positive urine culture:** Not defined.**Rate of infection:** 3.5% (57/1633 biopsies)**Timing and number of blood cultures:** Timing not clarified. 2 sets of blood cultures per patient.**Timing of presentation from biopsy:** 15 patients presented within 48hours (8 with positive blood cultures, 2 with positive urine cultures, no UTI symptoms, 8 ciprofloxacin-resistant), 26 patients within 2-3 days (5 with positive blood cultures, 7 with positive urine cultures, 8 with UTI symptoms, 1 ciprofloxacin-resistant) and 16 patients after 6-13 days (6 with positive blood, 10 with positive urine culture, 0 ciprofloxacin-resistant).**Lower urinary tract symptoms:** Of 15 patients presenting within 48 hours none had LUTS. Of 26 patients presenting at 2-3 days 8 had LUTS. Of 16 patients presenting at >6days 12 had LUTS. Data were insufficient to calculate discordance based on the presence or absence of LUTS.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**:Unclear |
| Akduman 2011 [[40](#_ENREF_40)] | **Country:** Turkey**Type of infectious complication:** Fever>38oC**Definition of infection:** Patients having fever greater than 38°C within 5 days of the procedure.**Definition of positive urine culture:** Not defined.**Rate of infection:** 3% (17 of 558 patients)**Timing and number of blood cultures:** Cultures were obtained before initiating antimicrobial treatment.**Timing of presentation from biopsy:** The mean interval between biopsy and presentation to the emergency room with fever was 1.4 day (range 0-3 days)(1 presented the same day, 10 the next day, 4 the 2nd day and 2 the 3rd day). Insufficient data to calculate discordance based on the timing of presentation. Nevertheless, this study was included in the subgroup analysis of patients presenting within 48 hours as only 2 of 17 patients presented after 48 hours and both presented the 3rd day.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/2 |
| Ismail 2011 [[41](#_ENREF_41)] | **Country:** UK**Type of infectious complication:** Sepsis n=7, UTI n=1**Definition of infection:** Patients admitted to the hospital due to post-procedure sepsis (n=7)/UTI (n=1). Not defined.**Definition of positive urine culture:** Not defined.**Rate of infection:** 4% (8 of 201 biopsies).**Timing and number of blood cultures:** Not reported**Timing of presentation from biopsy:** All presented within 2 days.**Lower urinary tract symptoms:** not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/4 |
| Mosharafa 2011 [[22](#_ENREF_22)] | **Country:** Egypt**Type of infectious complication:** Acute prostatitis (all febrile)**Definition of infection:** Patients admitted to the hospital within 30 days after the biopsy due to acute prostatitis (fever ≥38.0°C with or without chills in association with significant lower urinary tract symptoms and in the absence of other clinically apparent sources of infection).**Definition of positive urine culture:** Not defined.**Rate of infection:** 9.3% (10 of 107 patients)**Timing and number of blood cultures:** Not clarified.**Timing of presentation after biopsy:** Patients presented resented within 1-22 days (mean 3.2, median 2).**Lower urinary tract symptoms:** All patients by study design.**Laboratory findings:** All had fever. 7 had leukocytosis (>11000/μl).**Discordance in microbiological isolates in cases with both urine and blood cultures available**:Unclear (n=1) **Rectal cleansing/disinfection:**  Enemas were suggested at the discretion of the treating urologist and were usually administered the night before and the morning of the procedure (12 hours and 2 hours before the biopsy). 68.6% received a pre-biopsy enema. However, the data were insufficient to calculate discordance in the subgroup of patients that received an enema and those that didn’t. |
| Ekici 2012 [[39](#_ENREF_39)] | **Country:** Turkey**Type of infection:** Acute prostatitis (all febrile).**Definition of infection:** Patients with a post-biopsy clinical diagnosis (based on a defined fever of ≥38°C taken from the armpit and leukocytes in the urine sediment with clinical findings on digital rectal examination) of acute prostatitis requiring hospitalization.**Definition of positive urine culture:** Not defined.**Rate of infection:** Not reported.**Timing and number of blood cultures:** Obtained before initiation of antimicrobial treatment. Number of cultures per patient was not reported.**Timing of presentation after biopsy:** Interval to admission= 1 day (10 of the 13 patients were admitted within 1 day, 2 were admitted at day 2 and 1 at day 3).**Lower urinary tract symptoms:** All but one patients had dysuria. The single case without LUTS, was the only patients with positive blood but negative urine.**Laboratory findings:** Mean WBC count in patients with positive blood culture: 8020/μl versus 16600/μl in patients with negative blood cultures. 4 of the 6 patients with positive blood cultures had leukocytosis or leukopenia.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/5 |
| Patel 2012 [[42](#_ENREF_42)] | **Country:** UK**Type of infectious complication:** Fever**Definition of infection:** Patients with fever/rigors after a prostate biopsy.**Definition of positive urine culture:** Not defined.**Rate of infection:** 5% (16 of 316 patients)**Timing and number of blood cultures:** Cultures were obtained before initiation of antibiotics. The number of bloodcultures per patient was not reported.**Timing of presentation from biopsy:** The onset of fever and rigors was at a median (range) of 2 (1 – 4) days after biopsy. Insufficient data to calculate discordance based on the timing of presentation.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/1 |
| Loeb 2012 [[56](#_ENREF_56)] | **Countries:** 8 European countries= Netherlands, Switzerland, Spain, France, Sweden, Finland, Belgium, Italy.**Type of infectious complication:** Fever.**Definition of infection:** Patients with fever within 2 weeks after biopsy.**Definition of positive urine culture:** Not defined.**Rate of infection:** 4.2% (392 of 9241 patients) developed fever after the biopsy, and 0,8% (63 of 9198) were admitted to the hospital.**Timing and number of blood cultures:** Not clarified.**Timing of presentation after biopsy:** Not reported**Lower urinary tract symptoms:** Not reported**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/26 |
| Manecksha 2012 [[57](#_ENREF_57)] | **Country:** Ireland**Type of infectious complication:** Fever.**Definition of infection:** Patients with fever (>37.5oC) after a prostate biopsy. **Definition of positive urine culture:** Not defined.**Rate of infection:** 2.5% (30 of 1183 patients)**Timing and number of blood cultures:** Not clarified.**Timing of presentations after biopsy:** Not reported.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:**  Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/7 |
| Adibi 2013 [[43](#_ENREF_43)] | **Country:**  USA**Type of infectious complication:** febrile UTI and/or sepsis**Definition of infection:** Patients hospitalized due to infectious complication (febrile UTI and/or bacteremia) within 1 week after the biopsy. A febrile UTI was defined as fever 38oC or higher accompanied by 1 or more lower urinary tract symptoms (i.e. urgency, frequency, dysuria or suprapubic tenderness) with or without a positive urine culture. Patients with these symptoms in addition to other signs indicating a SIRS such as heart rate 90 beats per minute or greater, chills, diaphoresis, general prostration, along with laboratory markers of systemic infection, were hospitalized for suspected septicemia. A positive blood culture was required to define sepsis.**Definition of positive urine culture:** growth of more than 105 cfu/ml of a specific organism in blood or clean catch or catheterized urine.**Rate of infection:** 2.2% (13 of 600 patients)**Timing and number of blood cultures:**  Not reported.**Timing of presentation after biopsy:** 6 patients presented the 1st day, 3 patients presented the 2nd day, 2 patients the 3rd day, and 2 patients at day 7.**Lower urinary tract symptoms:** 12 of the 13 patients had lower urinary tract symptoms. **Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/4**Rectal cleansing/disinfection method**: self-administered sodium phosphate enema |
| Bang et al 2013 [[34](#_ENREF_34)] | **Type of infectious complication:** Acute prostatitis.**Definition of infection:** Cases in which acute prostatitis occurred within 7 days after the biopsy were investigated. The symptoms of a fever over 38℃, leukocytes in urine sediment, and tenderness of the prostate during digital rectal examination were defined as acute prostatitis.**Definition of positive urine culture:** Not defined.**Rate of infection:** 1.2% (21 of 1814 procedures)**Timing and number of blood cultures:** Cultures were obtained before initiation of antibiotics. The number of blood cultures obtained per patient was not reported.**Timing of presentation from biopsy:** Patients had shown symptoms from 2 days after biopsy on average. Insufficient data to calculate discordance based on the timing of presentation.**Lower urinary tract symptoms:****Laboratory findings:** By study design, all patients had pyuria. 15 patients (71.4%) showed leukocytosis (white blood cell>10,000 cells/mL).**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/9 |
| Lorber 2013 [[52](#_ENREF_52)] | **Country:** Israel**Type of infectious complications:** Sepsis.**Definition of infection:** Patients admitted because of sepsis within 10 days from the biopsy were recorded. Sepsis was not defined.**Definition of positive urine culture:** Not reported.**Rate of infection:** 2.4% (110 of 4655 patients).**Timing and number of blood cultures:**  Not clarified.**Timing of presentation after biopsy:** The average interval between the biopsy and admission dates was 2.85 days. Insufficient data to calculate discordance base on the timing of the presentation.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: Unclear (27 cases had both urine and blood culture positive) |
| Chiang 2013 [[23](#_ENREF_23)] | **Country:** Taiwan**Type of infectious complications:** Febrile UTI**Definition of infection:** “Definition of febrile UTI was based on the presence of the following criteria in the medical records: (1) a body temperature above 38°C two weeks after biopsy, (2) new-onset lower urinary tract symptoms (urgency, frequency, and/or dysuria) or acute epididymitis, and (3) the absence of other sources of infection.”**Definition of positive urine culture:** Not defined.**Rate of infection:** 1.9% (73 of 3694 biopsies).**Timing and number of blood cultures:** Unclear. At least one set in each patient.**Timing of presentation after biopsy:** Time to presentation: 1.7 ± 1.7 in the first study period, 1.2 ± 0.7 in the second study period. Insufficient data to calculate discordance based on the timing of the presentation.**Lower urinary tract symptoms:** By definition all patients had lower urinary tract symptoms.**Laboratory findings:** Of 3694 biopsies 73 (1.9%) patients experienced a febrile UTI. 69% had pyuria, 61% had leukocytosis.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: Unclear (21 cases had both urine and blood culture positive)**Rectal cleansing/disinfection method**: rectal disinfection with an iodine swab was performed four times |
| Campeggi et al 2014 [[35](#_ENREF_35)] | **Country:** UK**Type of infectious complications:** Acute prostatitis (90% febrile).**Definition of infection:** The diagnosis criteria of prostatitis included: a fever (temperature >37.9°C), positive urine analysis (bacteruria and/or leukocyturia >103/mL) and a painful prostate at DRE presenting within 30 days after the TRUS biopsy procedure. Urinary tract symptoms were not mandatory for the diagnosis.**Definition of positive urine culture:** Not defined.**Rate of infection:** 0,67% (20 of 3000 patients)**Timing and number of blood cultures:** Cultures were obtained before initiation of antibiotics. The number of blood cultures per patient was not reported.**Timing of presentation after biopsy:** Patients were readmitted to hospital within 2.90 ± 1.77 days (range 1–7 days) after biopsy. Insufficient data to calculate discordance based on the timing of presentationl.**Lower urinary tract symptoms:** 60% had voiding dysfunction, 20% had urinary retention. All had gross or microscopic hematuria.**Laboratory findings:**  Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/11**Rectal cleaning/disinfection method**: rectal enemas (Normacol; Norgine Pharma, Rueil‐Malmaison, France) 1 day and 3 h before the procedure |
| Tsai 2014 [[24](#_ENREF_24)] | **Country:** Taiwan**Type of infectious complications:** Fever.**Definition of infection:** Patients with febrile infections following a transrectal prostate biopsy.**Definition of positive urine culture:** Not defined.**Rate of infection:** 3.8% (53 of 1406 biopsies)**Timing and number of blood cultures:** Not clarified.**Timing of presentation after biopsy:** The times to onset of fever among the patients in the four study periods were 1.5±1.3 d, 3.7±2.7 d, 2.2±1.6 d, and 2.5±0.9 d, respectively.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: Unclear (4 cases with both urine and blood cultures positive) |
| Gopal Rao 2014 [[37](#_ENREF_37)] | **Country:** UK**Type of infectious complication:** Any infectious complication.**Definition of infection:** Hospital admission due to infectious complications within 30 days following a transrectal biopsy. Patients were defined as having confirmed infection if they had clinical features of infection and had bacteraemia or significant bacteriuria.**Definition of positive urine culture:** Significant bacteriuria was set at >105 cfu/ml.**Rate of infection:** 2.1% (30 of 1419)**Timing and number of blood cultures:** Not clarified.**Timing of presentation after biopsy:** The average interval between biopsy and hospital admission 5.8 days (SD ±4.9, median 3.5 days, range 1–16 days). 6 patients presented within 1 day [60% (3 of 5) with available blood cultures had bacteremia, while only 1 patient (17%) had a positive urine culture]. 6 patients presented the 2nd day (60% positive blood, 50% positive urine). 7 patients presented at 3-4 days (71% positive blood cultures, 86% positive urine). In the rest of the patients (presentation after 7 to 14 days) blood cultures were either negative or not obtained and urine was positive in 36%. 6 of 11 bacteremic patients presented within 2 days, 2 presented at 3 days and 3 at 4 days.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** The mean WBC of 14 patients with a reported WBC count was 14000/μl . The WBC count was not reported in any of the patients with bacteremia. **Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/6 |
| Gyorfi 2014 [[29](#_ENREF_29)] | **Country:**  USA**Type of infectious complications:** Culture-positive febrile infections.**Definition of infection:** Patients with post-biopsy culture positive (either blood or urine) febrile (>38.5oC) infection.**Definition of positive urine culture:** Not reported.**Rate of infection:** 1.4% (8 of 570 patients)**Timing and number of blood cultures:** Not clarified.**Timing of presentation after biopsy:** Not reported.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/2**Rectal cleansing/disinfection:** Povidone-iodine rectal swab was used in a quarter of the patients. However, none of these patients had an infectious complication. The use of pre-biopsy enema in the remaining patients was not reported. |
| Losco 2014 [[58](#_ENREF_58)] | **Country:** New Zealand**Type of infectious complications:** Fever**Definition of infection:** Symptoms of sepsis ≤6 weeks of biopsy. All with sepsis, defined as fever >38 °C in the presence of constitutional symptoms, were admitted for inpatient management.**Definition of positive urine culture:** Not defined.**Rate of infection:** 3.5% (6 of 170 patients)**Timing and number of blood cultures:** Cultures were obtained before initiation of antibiotic treatment. **Timing of presentation after biopsy:** Not reported.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/1 |
| Rudzinski 2014 [[59](#_ENREF_59)] | **Country:** Canada**Type of infectious complications:** Sepsis. (Only patients with sepsis were considered for our review, because the discordance rate could was not reported for other infections)**Definition of infection:** The definition of sepsis in our analysis is the presence of documented or suspected infection with at least 2 criteria for systemic inflammatory response syndrome (SIRS). **Definition of positive urine culture:** Not defined.**Rate of infection:** 2.3% (21 of 927)**Timing and number of blood cultures:** Not clarified.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/13 |
| Hayatzaki 2014 [[30](#_ENREF_30)] | Access only to the abstract of this study.**Country:** Denmark**Type of infectious complications:** Sepsis**Definition of infection:** Patients admitted to the hospital due to sepsis within 2 weeks after a transrectal prostate biopsy.**Definition of positive urine culture:** No access to the full-text.**Rate of infection:** 0.91% (4 of 511 biopsies).**Timing and number of blood cultures:** No access to the full-text.**Timing of presentation after biopsy:** No access to the full-text.**Lower urinary tract symptoms:** No access to the full-text.**Laboratory findings:** No access to the full-text.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/3 |
| Song 2014 [[25](#_ENREF_25)] | **Country:** Korea**Type of infectious complications:** Acute prostatitis (all febrile)**Definition of infection:** Patients with post-biopsy acute prostatitis defined as: a body temperature >38°C, increased leukocytes in urine sediment, and pathologic clinical findings by digital rectal examination**Definition of positive urine culture:** Not defined.**Rate of infection:** 0.91% (103 of 11345 procedures).**Timing and number of blood cultures:** Cultures were initiated before initiation of antibiotic treatment. The number of blood cultures obtained per patient was not reported.**Timing of presentation from biopsy:** Not reported.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** By definition all had pyuria.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: Unclear (27 cases with both urine and blood cultures positive) |
| Dai 2015 [[60](#_ENREF_60)] | **Country:** USA**Type of infectious complications:** Sepsis/bacteremia, acute prostatitis/UTI without bacteremia, epidedimitis.**Definition of infection:** Infectious complications within 30 days of biopsy requiring treatment. Infections were defined clinically. Bacterial cystitis was defined by pyuria (>5 white blood cells per high-powered field or positive leukocyte esterase on urine dipstick) and bacteriuria (≥105 colony-forming units/mL) with symptoms of dysuria, urgency, frequency, or hematuria. Pyelonephritis was defined as pyuria and bacteriuria with symptoms of fever, flank pain, nausea, or vomiting. Bacteremia was confirmed by the presence of microbial growth in blood cultures.**Definition of positive urine culture:** Unclear. Bacteriuria was defined as >105 CFU/ml. However, growth <104 was also reported (although without antimicrobial susceptibility date).**Rate of infections:** 2.3% (11 of 487 patients) (sepsis/bacteremia n=6, acute prostatitis/UTI without bacteremia n=4, epididymitis n=1)**Timing and number of blood cultures:** Not clarified**Timing of presentation after biopsy:** Not reported.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/3 |
| Luong 2015 [[44](#_ENREF_44)] | **Country:** USA**Type of infectious complications:** Any (fever 11 of 14, chills, nausea, frequency, dysuria, and urgency, at least 2 SIRS n=12)**Definition of infection:** Patients hospitalized due to infectious complications within 2 weeks after biopsy. Signs of infection: as fever, chills, nausea, frequency, dysuria, and urgency.**Definition of positive urine culture:** Not defined.**Rate of infection:** 0.7% (14 of 2093)**Timing and number of blood cultures:** Not clarified.**Timing of presentation after biopsy:** Median time to presentation= 2 days (within 1 day n=5, at 2 days n=4, at 3 days n=2, at 4 days n=2, and 1 at 7 days).**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** 9 patients had leukocytosis or leukopenia. **Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/4**Rectal cleansing/disinfection method:** self-administered fleet enema the night before or morning of the biopsy. |
| Kim 2015 [[8](#_ENREF_8)] | **Country:** Korea**Type of infectious complications:** Acute prostatitis.**Definition of infection:** Acute bacterial prostatitis was diagnosed in all patients according to typical symptoms (fever, dysuria, and voiding difficulty), pain on digital rectal examination and laboratory test results. Patients with other UTIs (e.g. epididymitis/orchitis or pyelonephritis) and patients with prior urologic manipulations including catheterization) were excluded.**Definition of positive urine culture:** Not defined.**Rate of infections:** Not reported.**Timing and number of blood cultures:** Not reported**Timing of presentation after biopsy:** Not reported**Lower urinary tract symptoms:** Part of the definition. But unclear how many patients had lower urinary tract symptoms.**Laboratory findings:** Mean peak WBC=13390/μl (SD 5070)**Discordance in microbiological isolates in cases with both urine and blood cultures available**: Unclear |
| Unnikrishnan 2015 [[50](#_ENREF_50)] | **Country:** USA**Type of infectious complications:** Post-biopsy “severe” infections**Definition of infection:** All patients were called 1-2 weeks after biopsy by a registered nurse to evaluate for infectious complications as part of an ongoing quality control initiative. Those reached were asked about symptoms of infection (dysuria, fever, chills, and frequency or urgency). Infections were categorized as severe if requiring either hospital admission, overnight stay within an observation unit, or emergency room evaluation and treatment for fevers or chills.**Definition of positive urine culture:** >104 CFU/ml**Rate of infections:** 1.6% (19 of 1189)**Timing and number of blood cultures:** Not clarified.**Timing of presentation after biopsy:** Not reported.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: |
| Dan 2015 [[9](#_ENREF_9)] | **Country:** Israel**Type of infectious complications:** Sepsis (all febrile)**Definition of infection:** Post-biopsy sepsis cohort: Inclusion criteria included recent TRUS prostate biopsy, fever (temperature, >38.0 °C), and positive blood and/or urine cultures for E. coli. Post-biopsy bacteremic UTI cohort: Inclusion criteria included male gender, fever (temperature, >38.0 °C), and positive blood and urine cultures for E. coli. Only the first cohort was considered or this review because the second cohort of patients had both urine and blood cultures positive by study design.**Definition of positive urine culture:** Not defined**Rate of infections:** Not reported.**Timing and number of blood cultures:** Not clarified.**Timing of presentation after biopsy:** All were admitted within 48 hours after the biopsy.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/9 |
| Iwamoto 2015 [[45](#_ENREF_45)] | **Country:** Japan**Type of infectious complications:** Acute prostatitis (all febrile).**Definition of infection:** Patients with bost-biopsy acute bacterial prostatitis diagnosed using these criteria: core body temperature > 38°C, the presence of leukocytes in the urine sediment, the isolation of any microorganisms from urine or bladder cultures, and tenderness of the prostate found on DRE within 7 days of the biopsy.**Definition of positive urine culture:** Not defined.**Rate of infections:** 1.5% (6 of 391 patients)**Timing and number of blood cultures:** Cultures were obtained before initiation of antibiotics. The number of blood cultures obtained per patient was not reported.**Timing of presentation after biopsy:** Median time to presentation 24 hours (4 of 6 presented within 24 hours, 1 at 72 hours and 1 at 168 hours).**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/1**Rectal cleansing disincection**: None of the patients received an enema before the biopsy. Disinfection of the rectum by using an iodine swab was at the discretion of the attending physician, but further data are not available.  |
| Anderson 2015 [[26](#_ENREF_26)] | **Country:** Australia**Type of infectious complications:** Sepsis**Definition of infections:** A case was defined as a patient who presented to hospital with sepsis due to suspected or confirmed infection related to the genitourinary tract or where no other focus of infection was clinically evident within 14 days of undergoing a TRUS biopsy. Sepsis was defined according to the ACCP/SCCM (1991) criteria as a systemic inflammatory response syndrome in the presence of an infective process.**Definition of positive urine culture:** Not defined.**Rate of infection:** Not reported.**Timing and number of blood cultures:** Not clarified.**Lower urinary tract symptoms:** Not reported.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: Unclear**Rectal cleansing/disinfection**: An enema was used in 43.6% of the patients. However the data were insufficient to calculate discordance in the subgroup of patients that received an enema compared to those who didn’t. |
| Miyazaki 2016 [[31](#_ENREF_31)] | **Country:** Japan**Type of infectious complications:** Febrile UTIs (all 3 were diagnosed with acute prostatitis)**Definition of infection:** Febrile UTI after biopsy. Not defined further.**Definition of positive urine culture:** Not defined.**Rate of infection:** 0.7% (3 of 447 patients)**Timing and number of blood cultures:** Cultures were obtained before initiation of treatment. The number of blood cultures per patient was not reported.**Timing of presentation after biopsy:** 2 patients presented within 1 day and 1 patients presented 3 days after biopsy.**Lower urinary tract symptoms:** All 3 (patient 1; hematuria and feeling of residual urine, patient 2; urination pain, patien 3; urination pain and urinary retention)**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/1**Rectal cleansing/disinfection:** all the patients who underwent TRUSB at the Nishi-Kobe Medical Center took sennoside orally (24 mg, before sleep), and were administered an enema (glycerine enema 120 mL, under 70 years old/ glycerine enema 60 mL over 71 years old) on the day of TRUSB, whereas the patients at Japanese Red Cross Otsu Hospital did not receive any bowel preparation. All infectious complications (i.e. the patients included in this meta-analysis) occurred in the latter hospital. |
| Samarinas 2016 [[48](#_ENREF_48)] | **Country:** Greece**Type of infectious complications:** Febrile UTI**Definition of infection:** Febrile UTI within 15 days post biopsy. Patients who reported fever, rigors, dysuria, frequency, urgency or suprapubic pain and/or two or more of the SIRS criteria were considered to have post-TRUS-Bx infection and were admitted to hospital.**Definition of positive urine culture:** >104 CFU/mL**Rate of infections:** 9.1% (10 of 110 patients)**Timing and number of blood cultures obtained:** Not clarified.**Timing of presentation after biopsy:** Not reported.**Lower urinary tract symptoms:** All 10 patients had lower urinary tract symptoms.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/4 |
| Trujillo 2016 [[61](#_ENREF_61)] | **Type of infectious complications:** Any biopsy-related complication (sepsis, bacteremia, UTI, fever, prostatitis, epididymitis).**Definition of infection:** Patients with infectious complications following prostate biopsy. Fever: >38.3oC. Sepsis: based on the Surviving Sepsis Campaign 2013. UTI: dusuria, urgency or frequency and urine test suggestive of infection. Prostatitis: painful prostate, warm to touch, sensitivity in the perineal area, accompanied by frequency, dysuria, weak stream. Epididymitis: unilateral testicular pain and edema. Bacteremia: positive blood culture within 7 days after biopsy.**Definition of positive urine culture:** Not defined.**Rate of infection:** 3.5% (40 of 1161 patients) (sepsis n=29, bacteremia n=3, UTI n=3, isolated fever n=2, prostatitis n=1, epididimyits n=1)**Timing and number of blood cultures:** Not clarified. Blood cultures were performed only when patients developed a fever while being hospitalized. Therefore, it is likely that at least some of the blood cultures were obtained after initiation of antimicrobial treatment. The number of blood cultures per patient was not reported.**Timing of presentation after biopsy:** Not reported.**Lower urinary tract symptoms:** It is unclear how many patients had lower urinary tract symptoms.**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: 0/3**Rectal cleansing/disinfection method:** Two rectal enemas (16 g monobasic sodium phosphate USP and 6 g dibasic sodium phosphate USP (Travad®)) were administered 2 h prior to the procedure. |
| Farrell 2017 [[32](#_ENREF_32)] | **Country:** USA**Type of infectious complications:** Sepsis**Definition of infection:** Sepsis was defined as inpatient hospitalization with evidence of infection within 30 days of TRUPB based on a positive blood culture or fever (T>38°C/100.4°F) plus one of the following: tachycardia (heart rate > 90 bpm), abnormal white blood cell (WBC) count (WBC<4,000 or >12,000 cells/mm3), or a positive urine culture.**Definition of positive urine culture:** Not defined.**Rate of infection:** 2.2% (6 of 268 biopsies)**Timing and number of blood cultures:** Not reported.**Timing of presentation after biopsy:** Not reported.**Lower urinary tract symptoms:** Not reported**Laboratory findings:** Not reported.**Discordance in microbiological isolates in cases with both urine and blood cultures available**: No cases. |

Abbreviations: UTI= urinary tract infection.

# Supplementary Table 2: Pooled discordance rate and statistical heterogeneity in subgroup analyses

|  |  |  |  |
| --- | --- | --- | --- |
|  | Pooled discordance (95% CI)(random effects) | I2 statistic | Chi2 statistic p value |
| Total | 14% (10.6-17.8) | 52.5% | <0.001 |
| Subgroups |  |  |  |
| Febrile patients | 14% (9.7-19) | 61% | <0.001 |
| Patients presenting within 2 calendar days | 19.6% (11.8-28.9) | 31% |  |
| Febrile patients with lower urinary tract symptoms | 11.2% (4.5-20) | 47.7% | 0.063 |
| Studies not using rectal cleansing/disinfection | 16% (7.9-26.2) | 63.8% | <0.001 |
| Studies using rectal cleansing/disinfection | 13.3% (4.7-25.5) | 67.4% | 0.009 |
| WHO-regions |  |  |  |
| Americas | 11.7% (7-17,4) | 8.5% | 0.4 |
| Europe | 11.8% (7-17.7) | 53.7% | 0.006 |
| Western Pacific | 19.4% (12.2-27.9) | 65.3% | 0.001 |
| Eastern Mediterranean (only 2 studies) | 15.7% (4.4-32) | 0% | 0.76 |

# Funnel plots and tests for asymmetry

Funnel plots and regression plots were made in Microsoft Excel.

## Traditional funnel plot

## Egger’s test

**Unweighted analysis:** Intercept=1,037, 95% confidence interval= 0.415-1.659, p=0.02.

**Analysis weighted by the inverse of the variance of log(odds)**: Intercept=0.708, 95% confidence interval=-0.59 to 1.476, p=0.069

## Alternative funnel plot

## Peter’s test

Slope= -1.206, 95% confidence interval=-5.878 to 3.466, p=0.604

# Meta-regression; Prediction of discordance rate by blood culture yield and urine culture yield

This analysis was performed in STATA 13 (StataCorp. 2013. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP.) using the metareg command (Roger Harbord & Julian Higgins, 2004. "[**METAREG: Stata module to perform meta-analysis regression**](https://ideas.repec.org/c/boc/bocode/s446201.html),"[Statistical Software Components](https://ideas.repec.org/s/boc/bocode.html) S446201, Boston College Department of Economics, revised 05 Jan 2009.):

1. For the first graph: . metareg (Freeman-Tukey transformed discordance rate) (blood culture yield), wsse(standard error of the transformed estimate) graph
2. For the second graph: . metareg (Freeman-Tukey transformed discordance rate) (urine culture yield), wsse(standard error of the transformed estimate) graph
3. For the table: . metareg (Freeman-Tukey transformed discordance rate) (blood culture yield) (urine culture yield), wsse(standard error of the transformed estimate) graph





|  |  |  |  |
| --- | --- | --- | --- |
|  | Coef. | p | 95% Conf. Interval |
| Urine culture yield | -1.033272 | <0.001 | -1.376265 to -.6902788 |
| Blood culture yield | 0.5989048 | 0.005 | 0.1961888 to 1.001621 |
| constant | 1.117407 | <0.001 | 0.8334495 to 1.401364 |

Proportion of between-study variance explained: Adj R-squared = 97.88%

# Subgroup analysis by geographical regions

## Pooled discordance rate by WHO region

|  |  |  |
| --- | --- | --- |
|  | WHO regions |  |
|  | Americas | Europe | Western pacific | Eastern Mediterranean | Total |
| Number of studies | 11 | 16 | 11 | 2 | 40 |
| Pooled discordance and 95% confidence intervals (random effects) | 11.7% (7-17,4) | 11.8% (7-17.7) | 19.4% (12.2-27.8) | 15.7% (4.4-32) | 14% (10.6-17.8) |
| I2 | 8.5% | 53.7% | 65.4% | 0 | 52.5% |
| Q | 10.9261 | 32.3991 | 28.864 | 0.0918 | 82.0196 |

### Pooled rate of positive blood cultures by WHO-region

|  |  |  |
| --- | --- | --- |
|  | WHO regions |  |
|  | Americas | Europe | Western pacific | Eastern Mediterranean | Total |
| Number of studies | 10 | 16 | 10 | 2 | 38 |
| Pooled rate of positive blood cultures and 95% confidence intervals (random effects) | 54.3% (26.2-65.3) | 38% (27.6-49) | 48.3% (43.1-53.5) | 34.8% (14-59.5) | 42.6% (35.9-49.4) |
| I2 | 84.4% | 76.7% | 0% | 37.38% | 73.7% |
| Q | 57.5887 | 64.4736 | 8.8522 | 1.5698 | 140.497 |

## Pooled discordance rate by continent

|  |  |  |
| --- | --- | --- |
|  | WHO regions |  |
|  | Americas | Europe | Asia | Oceania | Africa | Total |
| Number of studies | 11 | 11 | 15 | 2 | 1 | 40 |
| Pooled discordance and 95% confidence intervals (random effects) | 11.7% (7-17,4) | 13,9% (7.9-21.3) | 15.1% (8.9-22.6) | 18.5% (4.1-40) | NA | 14% (10.6-17.8) |
| I2 | 13.8% | 45.3% | 71% | 46.6% | NA | 52.45% |
| Q | 10.4442 | 18.2965 | 48.2074 | 1.8718 | NA | 82.0196 |