Patients at Risk of Invasive Extraintestinal Pathogenic *Escherichia coli* Disease: a Systematic Literature Review

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BACKGROUND

• Extraintestinal pathogenic *Escherichia coli* (ExPEC) is a common Gram-negative bacterial pathogen that causes a variety of infections including urinary tract infection (UTI), blood stream infection (BSI), sepsis, meningitis and pneumonia; mortality rate due to ExPEC is increasing globally.

• The most common ExPEC diseases are UTI and BSI (marked increase in incidence with age especially >50 years).

• Several studies have found increasing invasive ExPEC disease (IED) rates associated with increased morbidity, mortality and costs.

• IED prevention requires an understanding of its epidemiology and the population at increased risk for it. Several countries aim to introduce mandatory surveillance of E. coli BSI (EcoBSI) to investigate factors responsible for its increase.

• However, information regarding the epidemiology and people at increased risk of IED is relatively limited.

OBJECTIVES

Systematic literature review to describe IED epidemiology

• Identify patients at increased risk for IED, specifically EcoBSI, by measuring

  o Proportional contribution of different primary sites of infection to EcoBSI

  o EcoBSI incidence by specific patient settings vs. the general population

METHODS

Study design

A systematic literature review was performed as follows:

RESULTS:

Figure 5: Proportion of BSI due to *E. coli* in general population and specific patient populations

• Proportional contribution of different primary sites of infection to EcoBSI

  • Most common primary site for infection was urinogenital (range from included articles: 31%-80%, n=28 [os. of articles reporting the finding]) followed by hepatobiliary (11%-56%, n=6), gastrointestinal (4%-28%, n=12), and abdominal (5%-48%, n=10) (Fig 3)

  • Of the 386 articles included in qualitative synthesis, 153 did not identify potential outcomes and were excluded.

  • A range for the reported values of the different outcomes with the number of studies according to the different risk populations observed in the literature was provided.

  • In the overall contribution of *E. coli* to BSI in the general population was 25%. A high level of heterogeneity (I2=54%, p=0.0001; n=10) was observed.

• Patients at highest risk for ECOBSI were patients undergoing prostate biopsy, immunocompromised patients, and patients with cancer.

• Additional research is needed to better define high-risk groups for IED.

• The study selection and data collection were done using a 2-step process:

  o Step 1: Two reviewers independently review titles and abstracts obtained by electronic searches and articles per the inclusion and exclusion criteria. Discrepancies resolved by discussion or with help from a third reviewer.

  o Step 2: Full-text articles selected at Step 1 were assessed for eligibility by a single reviewer.

• Data were extracted from full-text articles using a standard extraction format.

• Statistical methods:

  • A range for the reported values of the different outcomes with the number of studies according to the different risk populations observed in the literature was provided.

  • For IED incidence in the general population, and the overall contribution of *E. coli* to BSI, DerSimonian meta-analysis was performed and pooled effect estimates calculated using a random-effects model (R and/or SAS 9.4).

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11. Leonidas Georgalis: employee of Janssen International N.V.


14. Patricia Ibarra de Palacios: employee of Janssen International N.V.

15. Thomas Verstraeten: employee of Janssen International N.V.


17. Peter Hermans, James Johnson and Jan Poolman are employees of Janssen Vaccines & Prevention B.V., Leiden, The Netherlands.


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