Skin and Soft Tissue Infections and Acute Kidney Injury (Review)

Sally R. Wilkes[1], Fiona Robertson[2], Douglas Grindlay[1,3], Esther Burden-Teh[1], Nicholas M. Selby[2,4]

[1]Centre of Evidence-Based Dermatology, School of Medicine, University of Nottingham, UK
[2]Division of Medical Sciences and Graduate Entry Medicine, University of Nottingham, UK
[3]Centre for Evidence-Based Veterinary Medicine, School of Veterinary Medicine and Science University of Nottingham, UK
[4]Department of Renal Medicine, Royal Derby Hospital, Derby, UK

Background

Acute Kidney Injury (AKI), previously known as Acute Renal Failure (ARF), is a rapid deterioration of renal function resulting in a failure to maintain fluid and electrolyte balance. If not detected in time, AKI may result in the kidneys shutting down, leading to irreversible damage and in some cases fatality. The definition of AKI has changed in recent years, and detection is now mostly based on monitoring creatinine levels, with or without urine output [1]. AKI is seen in 13 – 18% of all patients admitted to hospital, often as a serious complication of other acute illness, such as infection, or a complication of medicines management [2, 3]. Recent concerns have arisen that suboptimal care may be contributing to the development of AKI and, given that the number of inpatients affected by AKI has a major impact on the use of healthcare resources, there is now an increasing drive to reduce the incidence of preventable AKI [1, 4].

The incidence of AKI has been shown to be as high as 15% amongst patients with skin and soft tissue infections (SSTIs) [3]. This is not an insignificant number of AKI episodes given that the incidence of SSTIs is estimated to be as high as 496 per 10,000 person-years in some populations [5]. Furthermore, the incidence of SSTIs is likely to rise substantially in the next few years due to the growth of infections caused by methicillin-resistant Staphylococcus aureus [6]. As such, it is important for us to investigate possible reasons for the association between SSTIs and AKI and establish whether steps could be taken in the future to try and reduce the number of AKI episodes amongst SSTI patients.

Objectives

This systematic review of the literature aims to investigate the association between skin and soft tissue infections and acute kidney injury and provide a narrative of existing evidence.

Methods

Criteria for considering studies for this review

Types of studies

All clinical trials, observational studies and case studies will be considered for inclusion regardless of their publication status, language, blinding, size, duration of patient follow-up, or their primary objectives and reported outcomes.

Types of participants

Inclusion criteria
Patients of all ages with a skin or soft tissue infection.

Exclusion criteria
Patients undergoing dialysis at the start of the study.
Surgical wounds.
Burns.

Types of outcome measures
Primary Outcome
Incidence of Acute Kidney Injury

Secondary Outcomes

- Did the patient group have any specific comorbidities?
- Is there any mention of specific drugs used to treat the patients?
- Did any of the patients develop sepsis or have any other acute illnesses?

Search methods

Databases
We will search two databases:

- Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to Present
- Embase 1974 to 2014 Week 45

Search strategy
The search strategy will be as follows:

1. MEDLINE
   #1 soft tissue infection$.mp.
   #2 staphylococcal skin infection$.mp.
   #3 cellulitis.mp.
   #4 erysipelas.mp.
   #5 furunculosis.mp.
   #6 wound infection$.mp.
   #7 necrotizing fasciitis.mp.
   #8 necrotising fasciitis.mp.
   #9 exp Soft Tissue Infections/
   #10 exp Cellulitis/
   #11 exp Staphylococcal Skin Infections/
   #12 exp Skin Diseases, Bacterial/
   #13 exp Furunculosis/
   #14 exp Fasciitis, Necrotizing/
   #15 exp Erysipelas/

#16 exp Wound Infection/
#17 acute kidney injury.mp.
#18 AKI.mp.
#19 acute renal failure.mp.
#20 ARF.mp.
#21 acute kidney failure.mp.
#22 acute kidney disease.mp.
#23 acute kidney infection.mp.
#24 acute kidney damage.mp.
#25 acute renal disease.mp.
#26 acute renal injury.mp.
#27 acute renal infection.mp.
#28 acute renal damage.mp.
#29 RIFLE.mp.
#30 AKIN.mp.
#31 oliguria.mp.
#32 anuria.mp.
#33 nephrotoxicity.mp.
#34 acute tubular necrosis.mp.
#35 ATN.mp.
#36 acute interstitial nephritis.mp.
#37 acute tubulo-interstitial nephritis.mp.
#38 ATIN.mp.
#39 AIN.mp.
#40 TIN.mp.
#41 post-infectious glomerulonephritis.mp.
#42 exp Acute Kidney Injury/
#43 exp Oliguria/
#44 exp Anuria/
#45 exp Nephritis, Interstitial/
#46 exp Glomerulonephritis/
#47 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16
#48 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46
#48 47 and 48

2. EMBASE
#1 soft tissue infection$.mp.
#2 staphylococcal skin infection$.mp.
#3 cellulitis.mp.
#4 erysipelas.mp.
#5 furunculosis.mp.
#6 wound infection$.mp.
#7 necrotizing fasciitis.mp.
#8 necrotising fasciitis.mp.
#9 exp soft tissue infection/
#10 exp cellulitis/
#11 exp staphylococcal skin infection/
#12 exp bacterial skin disease/
#13 exp furunculosis/
#14 exp necrotizing fasciitis/

#15 exp erysipelas/
#16 exp wound infection/
#17 acute kidney injury.mp.
#18 AKI.mp.
#19 acute renal failure.mp.
#20 ARF.mp.
#21 acute kidney failure.mp.
#22 acute kidney disease.mp.
#23 acute kidney infection.mp.
#24 acute kidney damage.mp.
#25 acute renal disease.mp.
#26 acute renal injury.mp.
#27 acute renal infection.mp.
#28 acute renal damage.mp.
#29 RIFLE.mp.
#30 AKIN.mp.
#31 oliguria.mp.
#32 anuria.mp.
#33 nephrotoxicity.mp.
#34 acute tubular necrosis.mp.
#35 ATN.mp.
#36 acute interstitial nephritis.mp.
#37 acute tubulo-interstitial nephritis.mp.
#38 ATIN.mp.
#39 AIN.mp.
#40 TIN.mp.
#41 post-infectious glomerulonephritis.mp.
#42 exp acute kidney failure/
#43 exp oliguria/
#44 exp anuria/
#45 exp interstitial nephritis/
#46 exp glomerulonephritis/
#47 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16
#48 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46
#48 47 and 48

Data collection and analysis

Selection of studies

The review will be undertaken by five authors (SRW, FR, DG, EB, NMS). The search strategy described will be used to obtain titles and abstracts of studies that might be relevant to the review. Two authors (SRW and FR) will independently selected the abstracts identified in our search. If any of the authors consider a citation to be relevant for inclusion then the full text article will be assessed by the same two authors. In the case of a disagreement, the authors will discuss the reasons for their decisions. If the disagreement is not resolved during this process, a third author will make the final decision (NMS).

Data extraction and management

Data extraction will be carried out independently by SRW and FR using standard data extraction forms. Disagreements will be resolved by consensus. Studies reported in non-English language will be

translated before assessment. Duplicate publications or substudies of included studies will be listed under the primary reference as they may provide information on relevant outcomes not available in the original publication. Any further information required from the original author will be requested by written correspondence.

Contribution of Authors

Draft the protocol - SRW, DG
Study selection - SRW, FR
Extract data from studies - SRW, FR, NMS
Carry out the analysis - SRW
Interpret the analysis - SRW, FR, EB, NMS
Draft the final review - SRW, FR, DG, EB, NMS
Disagreement resolution - SRW, FR, EB, NMS

Potential Conflict of Interest

The authors have no conflicts of interest to declare.

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