

Incidence of hospital-acquired infections following kidney, pancreas or kidney-pancreas transplantations: a surveillance-based study

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P1530

Background

Hospital acquired infections (HAI) are frequent complications of the early post-transplantation period.

In kidney recipients, the most frequent infections are urinary tract infection (ranging from 23 to 57%), surgical site infection (7-19%), pneumonia (5-16%) and bacteremia (4-5%) during the first month post-transplantation¹.

Contamination of preservation fluid often lead to antibiotic prescription.

The objective was to report the incidence of HAI among kidney, pancreas or kidney-pancreas transplant recipients in a French university hospital.

¹ P. Dorschner, et al. Nosocomial infections within the first month of solid organ transplantation

Methods

- Active **standardized surveillance** of HAI among kidney, pancreas or kidney-pancreas recipients in a university hospital of 800 beds (Lyon, France).
- All patients transplanted between October 1, 2013 and December 31, 2015 followed during their hospital stay or up to 30 days post-transplantation
- HAI included urinary tract infections, bacteremia, surgical site infections and pneumonia
 - National standardized definition of HAI used
 - Only the first infection per site and per patient analyzed
- Incidence expressed per 1000 patient-days with their 95% confidence interval (95%CI)
- Multivariate Poisson regressions adjusted on gender, age, ASA score and time period were fitted to assess the risk of HAI globally and by site
- Adjusted incidence rate ratio were calculated (aIRR)

Results – Study population

- Overall, **377 transplanted patients** accounting for 6910 patients-days were analyzed:
 - 317 kidney transplantations
 - 10 pancreas transplantations
 - 50 kidney-pancreas transplantations
- Mean age: 52 years (range 19 – 80y)
- 60% of men
- Mean BMI: 25 (range 15-38)
- 28% ASA 2, 71% ASA 3
- Mean cold ischemia duration was 12.6 hours (±6.5)
- Complications:
 - 6 patients deceased (2%)
 - 11% undergone a revised surgery
 - 5% of graft were removed
- Mean length of stay, length of urinary catheterization and central venous catheterization were respectively 18 days (±14), 8 days (±5), and 10 days (±5)
- Antibiotic prophylaxis:
 - Ceftriaxone: 95% of kidney transplanted patients
 - Ceftriaxone + Metronidazole ± Fluconazole: 87% of kidney-pancreas transplanted patients

Results - Incidence

- 61 patients (16.2%)** presented ≥ 1 HAI accounting for **82 infections**
- HAI incidence was 10.4 (95%CI: 8.1-13.3) per 1000 patient-days, with no difference according to:
 - transplantation type (aIRR=1.03; 95%CI: 0.48-2.22) in kidney vs. kidney-pancreas or pancreas recipients
 - time period (aIRR=0.96; 95%CI: 0.79-1.16, per 1 semester)
- Table and Figure 1**
- HAI :
 - Urinary tract infections incidence: 6.8 (95%CI: 5.0-9.0; N=44)
 - Bacteremia incidence: 2.9 (95%CI: 1.8-4.4; N=19)
 - Pneumonia incidence: 1.0 (95%CI: 0.4-2.0; N=7)
 - Surgical site infections incidence: 1.9 (95%CI: 1.0-3.2; N=12) were more frequent in kidney-pancreas or pancreas compared with kidney only recipients (aIRR=9.31; 95%CI: 1.72-50.18)
- no differences according to transplantation type after multivariate analysis
- Preservation fluid was contaminated in 32% of cases, with negative coagulase *Staphylococcus* identified in 59% and *Enterobacteriaceae* in 14%
- Contamination of preservation solution not associated with HAI risk (aIRR=0.77; 95% CI: 0.44-1.40)
- The 3 most frequent causative microorganisms were *Escherichia coli* (30%), *Enterobacter cloacae* (17%) and *Pseudomonas aeruginosa* (14%).
- Enterobacteriaceae* represented 56% of isolated microorganisms (**Figure 2**), with 62% of third generation of cephalosporin resistance.

Table. Attack rate and incidence of healthcare associated infections by infection type and by transplantation type

	Kidney transplantation (N=317)		Kidney-pancreas transplantation (N=50)	
	Attack rate, % (95% CI)	Incidence, N/1000 patient-days (95% CI)	Attack rate, % (95% CI)	Incidence, N/1000 patient-days (95% CI)
Healthcare associated infection	16.1 (12.2-20.7)	11.2 (8.3-14.7)	22.0 (11.5-36.0)	10.3 (5.2-18.5)
Urinary tract infection	12.6 (9.1-16.8)	8.1 (5.8-11.1)	8.0 (2.2-19.2)	2.9 (0.8-7.4)
Bacteremia	5.0 (2.9-8.1)	3.2 (1.8-5.2)	6.0 (1.3-16.5)	2.1 (0.4-6.2)
Surgical site infection	1.6 (0.5-3.6)	1.0 (0.3-2.3)	14.0 (5.8-2.7)	6.2 (2.5-12.8)
Pneumonia	2.2 (0.9-4.5)	1.4 (0.5-2.8)	0	0

Figure 1. Attack rate evolution of healthcare associated infections, for all transplanted patients, by infection type

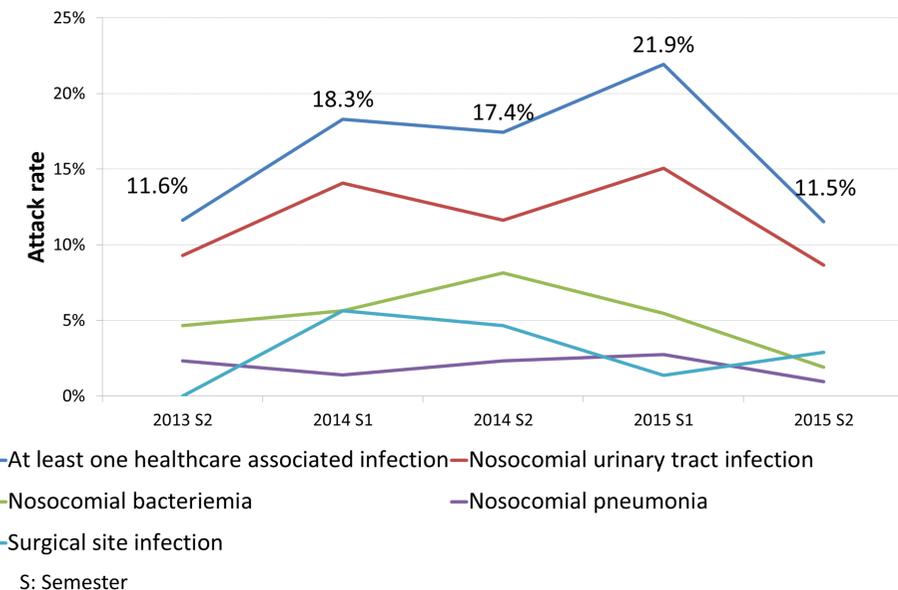
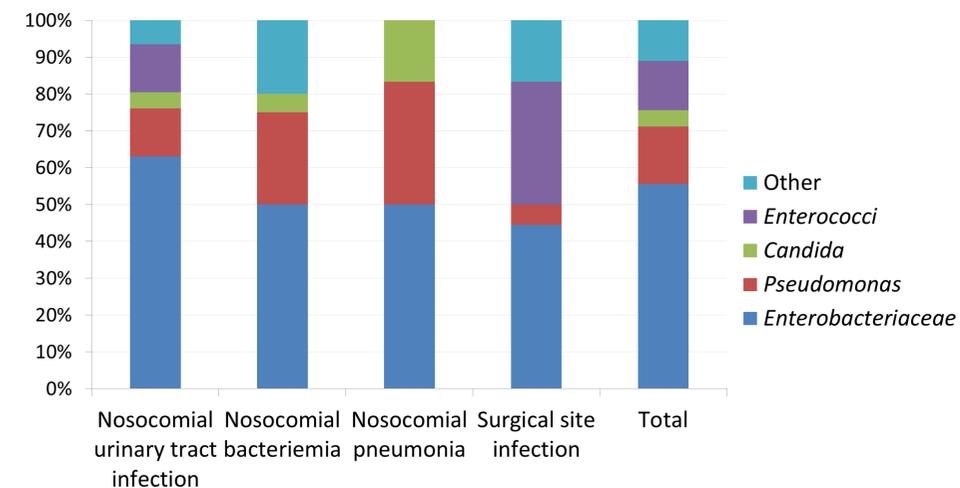


Figure 2. Micro-organisms isolated from healthcare-associated infections, for all transplanted patients, by infection type



Discussion

16% of kidney and/or pancreas transplanted patients had developed at least one HAI during post-transplantation hospitalization.

The most frequent HAI was urinary tract infection and the most frequent micro-organism involved was *Escherichia coli*.

Incidence rates varied according to infection site and transplantation type and were not independently associated with contamination of preservation fluid.

Local surveillance permit healthcare improvement and collaborative works with urologists and nephrologists and facilitates the implementation of appropriate preventive measures.

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