Evaluation of clinical, economic and organisational impacts of pharmacists' interventions on immunosuppressive therapy management among lung transplant outpatients

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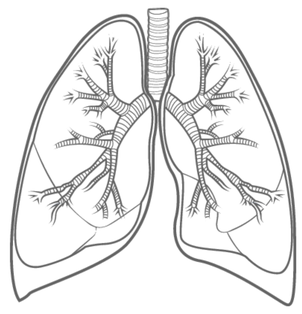
Background and purpose

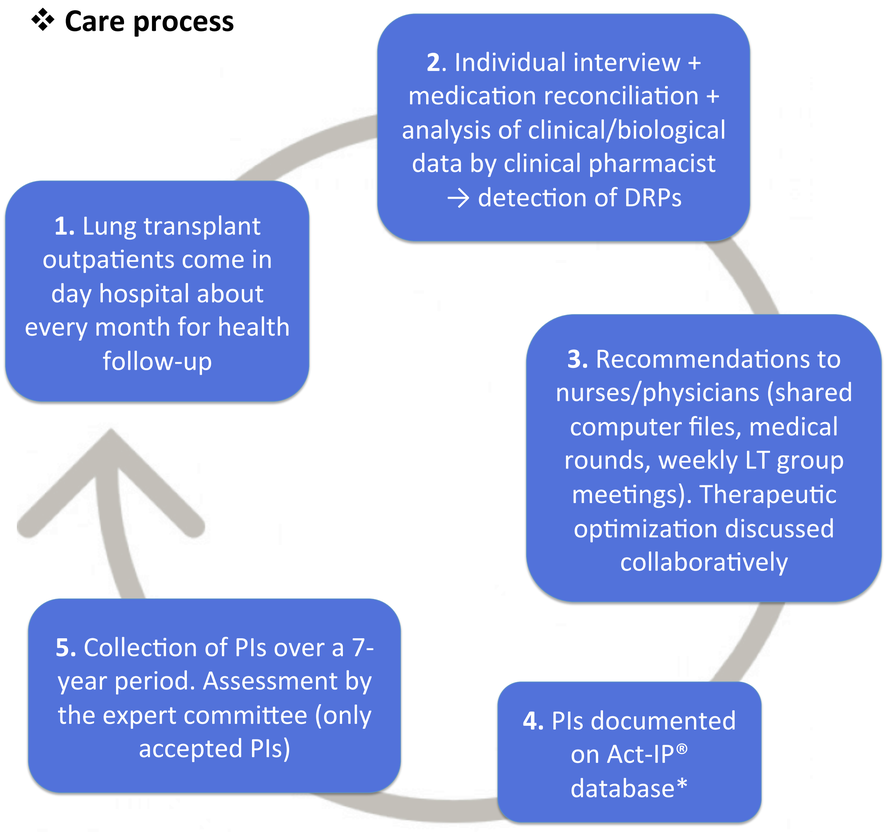
Lung transplant recipients require multidisciplinary care because of therapeutic management complexity, such as **life-long immunosuppressive therapy (1,2)**. Clinical pharmacists are able to detect **drug related problems (DRPs)** and provide recommendations to physicians for improving patient care. The potential significance of **pharmacists' interventions (PIs)** has never been studied by a multidimensional approach in **lung transplantation (LT) (3)**.



Purpose: To assess the **clinical, economic and organisational impacts** of PIs on immunosuppressive therapy management among lung transplant outpatients.

Population and methods

❖ **Care process**



* French Society of Clinical Pharmacy's tool (SFPC): patient's features, description of the DRP and the PI according to the SFPC classification

❖ **Retrospective analysis** of PIs from 1st January 2009 to 31th December 2015
❖ Study population: 234 lung transplant patients followed at Grenoble University Hospital
❖ PIs impact evaluation: ▪ **Expert committee**: 1 pneumologist, 1 pharmacovigilant, 1 clinical pharmacist
▪ Tool: « **CLEO** » **scale** (4)

	Score	Impact	Definition: the clinical impact is evaluated according to the most likely case expected
CLINICAL IMPACT	-1C	Nuisible	The PI can lead to adverse outcomes on clinical status, knowledge, satisfaction, patient adherence and/or quality of life of the patient
	0C	Nul	The PI can have no influence on the patient regarding the clinical status, knowledge, satisfaction, patient adherence and/or quality of life of the patient
	1C	Minor	The PI can improve knowledge, satisfaction, medication adherence and/or quality of life OR the PI can prevent damage that does not require monitoring/treatment
	2C	Moderate	The PI can prevent harm that requires further monitoring/treatment, but does not lead or do not extend a hospital stay of the patient
	3C	Major	The PI can prevent harm which causes or lengthens a hospital stay OR causes permanent disability or handicap
	4C	Vital	The PI can prevent an accident that causes a potentially intensive care or death of the patient
	ND	Non-determined	The available information does not determine the clinical impact
ECONOMIC IMPACT	-1E	Increase of cost	The PI increases the cost of the drug treatment of the patient
	0E	No change	The PI does not change the cost of the drug treatment of the patient
	1E	Decrease of cost	The PI saves the cost of the drug treatment of the patient
	ND	Non-determined	The available information does not allow to determine the economic impact
ORGANI-SATIONAL IMPACT	-1O	Desfavorable	The PI reduces the quality of care process
	0O	Null	The PI does not change the quality of care process
	1O	Favorable	The PI increases the quality of care process
	ND	Non-determined	The available information does not identify the organisational impact

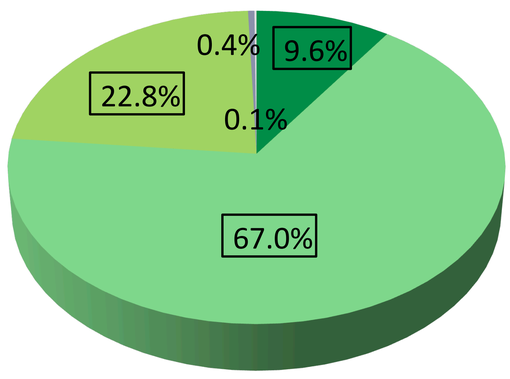
Results

➢ Overall, 1568 PIs performed, including 713 (45.5%) related to immunosuppressive drugs. Among PIs related to immunosuppressants (IS):
- Physician acceptance rate of PIs: **94% (N=670)**
- IS involved in PIs: **tacrolimus (58.5%)**, everolimus (26.5%), glucocorticoids (8.0%), mycophenolic acid (5.0%), ciclosporin (1.0%), azathioprine (1.0%)

Example:

Drug 1	Drug 2	Cli.	Eco.	Org.	Problem	Intervention
Tacrolimus 2mg/day	Voriconazole 400mg/day	**3C**	**1E**	**0O**	Voriconazole for pulmonary aspergillosis: strong enzymatic inhibitor of CYP 450 3A4 leading to ↗ of tacrolimus residual level to 20.3µg/L (target: 5-10µg/L)	Decrease tacrolimus dosage to 1mg/day + drug monitoring Day +7

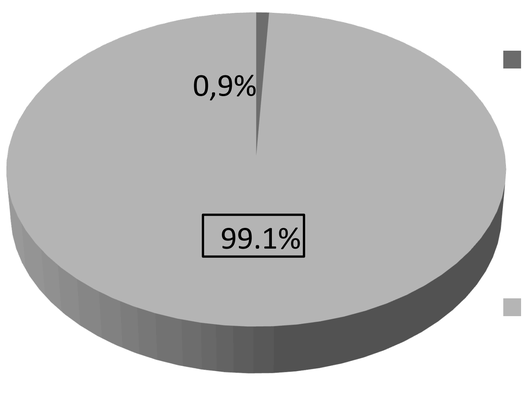
❖ Clinical impact



N=670

- 3C ⟶ Drug-drug interactions between IS and antifungals (56.0%), supratherapeutic dosage (25.0%)
- 2C ⟶ Supratherapeutic dosage (32.7%), subtherapeutic dosage (42.1%), adverse drug reaction (11.6%)
- 1C ⟶ Supratherapeutic dosage (41.2%), drug monitoring (17.0%), adverse drug reaction (14.4%)
- 0C ⟶ Dose adjustment without any impact
- ND ⟶ Lack of information

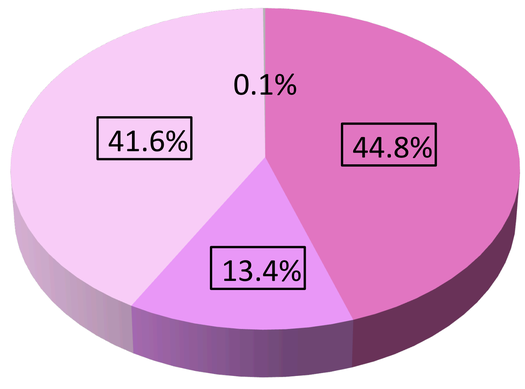
❖ Organisational impact



N=670

- -1O ⟶ Immunosuppressant « area under curve » monitoring
- 0O ⟶ No organisational impact on quality of care process from health care providers' viewpoint

❖ Economic impact



N=670

- 1E ⟶ Dose decrease or drug discontinuation due to supratherapeutic dosage, adverse drug reaction, infectious disease or no indication (antifungals)
- 0E ⟶ Usual drug monitoring (32.2%), drug switch with same cost (52.2%)
- -1E ⟶ Dose increase (74.9%), adding of drug monitoring (24.4%)
- ND ⟶ Lack of information

Discussion - Conclusion

To our knowledge, this is the first study assessing not only clinical, but also economic and organisational-related dimensions of PIs in LT. We used a validated tool (CLEO) to assess potential significance of PIs. Our structured pharmacist collaborative care program underlines that clinical pharmacist has a key role in lung transplant patients' management, as 10% of his PIs have a major clinical impact. His intervention is largely relevant (94% of PIs accepted), in order to optimize immunosuppressive therapy management and improve patient care.

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Patients