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COST-EFFECTIVENESS EVALUATION OF THE INTRA-DUODENAL CONTINUOUS LEVODOPA INFUSION IN ADVANCED AND SEVERE PARKINSON'S DISEASE

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Background

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- ❖ **Parkinson's disease** (PD) is a chronic condition associated with degeneration of neurons in the brain
- ❖ It is characterized by **motor and non-motor symptoms**, often difficult to control.
- ❖ The **quality of life** of patients is affected by these symptoms, often resulting in disabilities that interfere with daily activities and social life.
- ❖ The spiral of cost of the condition is often added to the spiral of motor, psychic and cognitive degradations caused by the disease.
- ❖ Associated with the aging of the population, it's becoming a public health issue

Parkinson Disease Treatment

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- The implementation of a drug treatment is a progressive process that requires multiple adjustments, both in the choice of the most suitable drug and in the identification of the optimal dose.
- The aims of the various treatments are
 - to **reduce and relieve the symptoms**, without stopping the progression of the disease.
 - to restore a normal concentration of dopamine in the brain
- **Levodopa Continuous Infusion of Gel (LCIG)** is a new alternative to control motor complications by allowing the programming and the adaptation of doses as needed.

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Objective of the study

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To estimate the cost-effectiveness of a new treatment in Parkinson disease

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METHODS

CECILE Study

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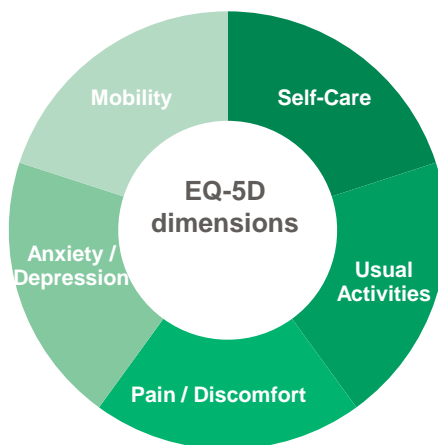
- Prospective, double-blind, randomized and multicenter study
- Routine follow-up over 1 year (4 visits) in 21 centers in France between 2010 and 2016
- Two randomization arms:
 - Optimized Conventional Oral Therapy (OCOT)
 - Levodopa Continuous Infusion of Gel (LCIG)
- Primary endpoint: **PDQ-39 quality of life score at 6 months**
- Secondary end points : **EQ-5D-3L + 9 clinical scales**
- e-CRF for patients and caregivers filled during each visit
- 43 patients included in the FAS analysis population
 - 23 patients in the OCOT arm
 - 20 patients in the LCIG arm

Data Input (1/2)

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Utility data :

- EQ-5D-3L : a standardized health status instrument providing an interval scale for measuring the intervention incremental effect on health of the LCIG treatment
- Each of the 5 dimensions is divided into 3 level of perceived problems :
 - Level 1 : no problem
 - Level 2 : some problems
 - Level 3 : extreme problems
- Health states may be converted into a single summary index by applying a formula that essentially attaches weight to each of the levels in each dimension such as to obtain French tariffs for the overall score (Julie Chevalier in France)



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Data Input (2/2)

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Effectiveness : survival analysis before death or adverse event attributable to the treatment

Cost data :

« Collective » perspective

- Outpatient resources consumption:** RUD questionnaire with direct medical care and direct non-medical care
 - Medical consultations
 - Paramedical acts
 - Biological acts
 - Radiological acts
 - Drugs
 - Transportation between home and hospital
 - Family caregivers time
- Hospital resources consumption:** based on a PMSI study

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Statistical & Economic analysis

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Statistical

- ❖ **Incomplete data** : Multiple imputation
- ❖ **Survival analysis** : Kaplan Meier
- ❖ **QALYs** : Manca method
- ❖ **Treatment of uncertainty** : Sensitivity analysis by resampling (non parametric bootstrap method)

Economic

❖ ICER :

$$\frac{C_2 - C_1}{E_2 - E_1}$$

❖ Net Monetary Benefit :

$$NMB = WTP \cdot E - C$$

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RESULTS

Base Case at 6 months

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Resource	Treatment	Mean (€)	Std Dev	p-value
Costs				
Transportation	LCIG	1 252,01	1 118,48	0,160
	OCOT	794,90	956,80	
Medical	LCIG	104,21	91,71	0,317
	OCOT	166,50	214,70	
Paramedical	LCIG	2 017,53	1 821,37	0,691
	OCOT	2 230,20	2 794,30	
Caregivers time	LCIG	2 153,89	2 354,74	0,705
	OCOT	6 258,40	22 518,36	
Drug	LCIG	2 985,61	3 038,59	0,004
	OCOT	8 165,10	6 997,95	
Hospitalisation	LCIG	5 928,11	9 622,04	0,188
	OCOT	2 728,50	2 780,87	
Total cost	LCIG	13 189,35	9 618,32	0,342
	OCOT	19 548,70	25 483,96	

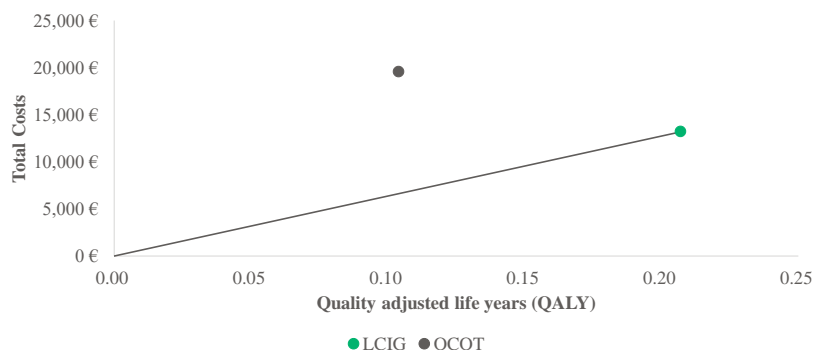
Visite	Treatment	Mean	Std Dev	p-value
EQ-5D-3L				
D0	LCIG	0,3	0,34	0,39
	OCOT	0,22	0,26	
D0 + 6	LCIG	0,42	0,3	0,03
	OCOT	0,22	0,26	

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ICER & Efficiency Frontier

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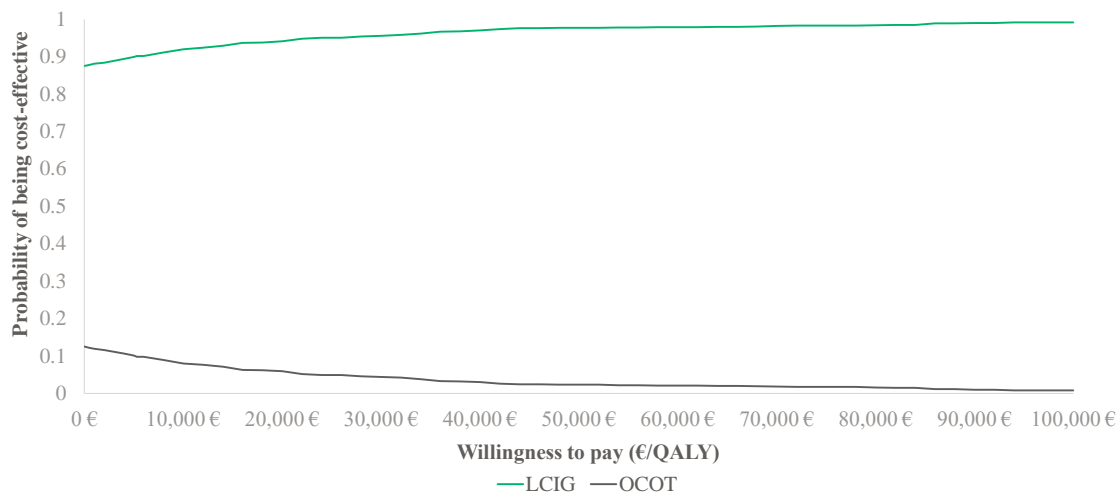
Interval	Treatment	Cost	ΔCost	p-value	QALY	ΔQALY	p-value	ICER
D0 ~ D0 + 6	LCIG	13 189,35	-6 359,35	0,342	0,207	0,103	0,02	<0
	OCOT	19 548,70			0,104			



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Acceptability curve

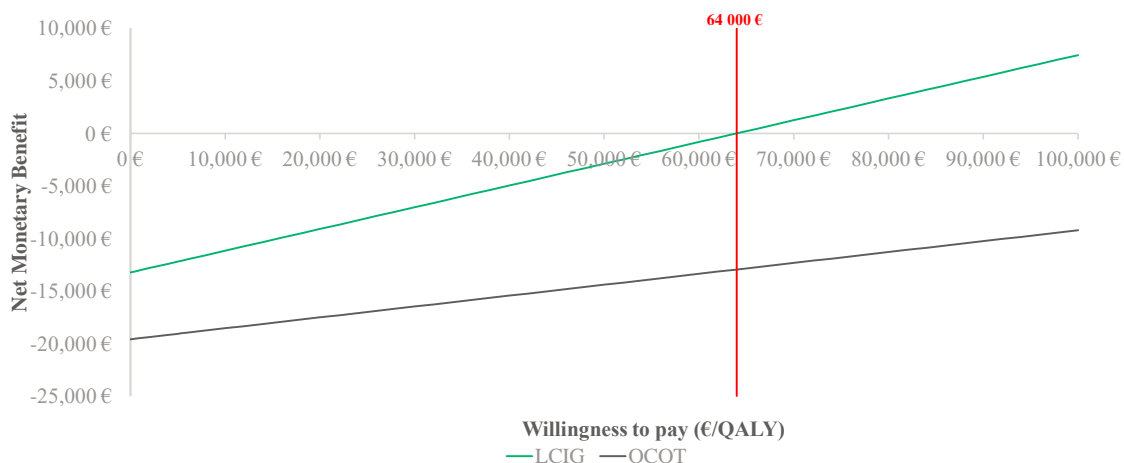
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Net Monetary Benefit

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Discussion

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- LCIG achieves a reduction of motor fluctuations improving patients' QoL. LCIG is a cost-effective therapy and could be seen as an alternative treatment to OCOT for the patients with advanced PD.
- ICER's challenge is to compare with a value of WTP. NMB is a simpler method for dealing with uncertainty and an unambiguous criterion for choosing between strategies.
- **Further research** : Exploitation of the follow-up at 12 months while taking into account the treatment switching at 6 months in order to have results in the long term

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THANK YOU FOR YOUR ATTENTION

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