How to determine surgical pathway operating costs in chronic rhinosinusitis with nasal polyposis patients? The Time Driven Activity-Based Costing experiment

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BACKGROUND & OBJECTIVES

- Surgical approaches and healthcare processes are subject to technological advancement and today more and more different techniques and instrumentations are available
- It becomes increasingly necessary to evaluate the current pathways adopting a critical approach: a particular focus should be given to the Non-Communicable Diseases (NCDs), whose management is becoming relevant and with a significant burden on NHS, all over the world

- One of these NCDs is represented by the Chronic Rhinosinusitis with Nasal Polyposis (CRSwNP), a clinical condition caused by the Type 2 inflammation and that can have a great impact on patients' quality of life
- Treatment' options for this disease are limited and not granting the complete and total wellbeing of patients
- The primary objective of the present study is **to evaluate the economic resources absorption related to the diagnostic, surgical and therapeutic pathway of CRSwNP patients**, assuming the hospital perspective and stratifying for different patients' clinical characteristics

METHODS

- Real-world data concerning CRSwNP pathway and related costs were collected from the management controls' analytical accounting flows, gathered in 2 public and 1 private Italian hospitals
- The micro-costing approach was used to quantify diagnostic services, drugs assumption, consumables; hospitalization costs, overhead costs, management of comorbidities and adverse events due to surgery
- A Time-driven Activity-Based Costing (TDABC) approach was adopted for human resources and equipment costs allocation, in terms of amortization and use
- Four categories of patients were identified: 1) patient's ineligible for surgery; 2) having 1 intervention; 3) having more than 1 intervention; 4) those who continue to receive corticosteroid treatments, although being eligible for surgery
- The analysis considered a 24-month timeframe
- Where available, data and information were retrieved from the existing literature, with particular regard to the occurrence of reintervention and adverse events
- The following process phases were economically evaluated:

1. Diagnosis
2. Drug treatment
3. Surgical intervention (FESS)
4. Management of comorbidities
5 Management of adverse events
6. Follow-up

RESULTS

Population distribution

Most part of CRSwNP patients (51.61%), may be eligible for a surgical treatment. Only 7.02% of patients could not experience any intervention, thus being treated with specific drugs

Pathway	Distribution
Group 1 - Patients not eligible for surgery	7.02%
Group 2 - Patients having 1 intervention	51.61%
Group 3 - Patients having more than 1 intervention	17.88%
Group 4 - Patients continue treated with INCS/OCS	23.49%

1. Diagnosis

Diagnostic services and the average number of exams, divided for each sub-pathway, were identified and evaluated

Patients not eligible for surgery	Patients having 1 intervention	Patients having more than 1 intervention	Patients treated with INCS/OCS
239.48 €	311.36 €	583.60 €	290.70 €

2. Drug treatment

The total costs related to **INCS administration is equal to 649.20 €**, representing an out of pocket expenditure for the patients, with a relevant impact in terms of families' economic burden

The total costs related to **OCS administration is equal to 37.60 €,** and this amount is covered by the NHS

These costs are attributable to all the four groups of patients, as drug therapy is prescribed and administered to keep the therapeutic condition under control over the long term

3. FESS intervention

The costs related to every intervention have been divided into macro-categories quantified through hospitals' support

Cost item	FESS intervention cost in case of hospitalization	FESS intervention cost in case of Day Hospital
Human resources	275.21 €	275.21 €
Equipment	299.08 €	299.08 €
Drugs and consumables	325.13 €	325.13 €
Pre- and post- intervention visits	162.45 €	162.45 €
Length of stay	774.74 €	178.24 €
General costs	363.71 €	246.77 €
Total	2,200.32 €	1,486.88 €

4. Management of comorbidities

The cost related to the treatment of all possible comorbidities related to Type 2 inflammation was esteemed in the 24 months timeframe, considering the main therapies needed to manage the potential comorbidities
This cost is equal to **1,251.61 € per patient**

5. Management of adverse events

The cost of adverse events occurring after surgery was calculated considering the occurrence of each event (data collected from literature) and multiplying these rates per the average cost of management. The average weighted cost thus obtained **is 65.19 €, valid for every surgical intervention**

6. Follow-up

Basing on what declared by physicians, it was calculated the number of follow-up visit for every sub-pathway. Thus, this number was multiplied per the average cost of every visit, obtaining the following:

Patients not eligible for surgery	Patients having 1 intervention	Patients having more than 1 intervention	Patients with INCS/OCS
211.42 €	338.27 €	539.12 €	147.99 €

Synthesis

Cost of every phase of pathway	Patients not eligible for surgery	Patients having 1 intervention	Patients having more than 1 intervention	Patients treated with INCS/OCS
Diagnostic pathway	239.48 €	311.36 €	583.60 €	290.70 €
Drug treatment	0.00 €	0.00 €	0.00 €	0.00 €
FESS surgery	0.00 €	1,486.88 €	2,200.32 €	0.00 €
Management of comorbidities	1,251.61 €	1,251.61 €	1,251.61 €	1,251.61 €
Adverse events	0.00 €	65.19 €	130.38 €	0.00 €
Follow-up	211.42 €	338.27 €	539.12 €	147.99 €
Total	**1,702.51 €**	**3,453.31 €**	**4,705.03 €**	**1,690.30 €**

CONCLUSIONS

The evaluation was carried out considering a time horizon of 24 months, even knowing that the entire management of a patient could require a much longer period

The results could be relevant for decision makers, both for the review of internal procedures (also in relation with the reimbursement tariffs) and to link costs data with outcome measures

Further investigations should explore indirect costs related to absenteeism/lack of productivity, thus considering social costs too, and the impact of innovative biologic therapies. This could provide an in-depth analysis on the factors influencing the clinical choice

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