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Background

- Survivors of hypothalamic and sellar/suprasellar tumors face a risk for significant morbidity impacting health and quality of life.
- Hypothalamic obesity (HO), which presents with rapid weight gain, is often severe and associated with mechanical and metabolic consequences.
- Data on the epidemiology of HO is scarce and information on population-based healthcare resource utilization and costs are almost entirely lacking.

Objective

- The purpose of this study was to develop a database algorithm for the standardized identification of HO-patients and related tumor diagnoses. We used this algorithm to calculate the HO epidemiology (poster reference number EPH61).
- Based on this HO-incidence population, we investigated the economic aspects of HO diagnosis and subsequent treatments, such as healthcare resource use and related costs.

Methods

Study Design

- Retrospective rolling-cohort design based on a representative German claims database (n=5.24 million) covering the years 2011-2019.

Inclusion Criteria

- Incident surgery or radiotherapy and HO-associated tumor diagnoses* (n=3,976).
- HO was identified by at least one incident obesity diagnosis and validated by incident diabetes insipidus diagnoses and desmopressin prescriptions within the quarter of surgery/radiotherapy or subsequent four quarters.**
- Definition of tumor diagnosis ICD-10 codes and other relevant patient identification criteria were made based on literature and after review of medical records of HO patients by the study team (JB, SB, HLM) treated at a large German pediatric clinic.
- Incident patients requiring HO-associated tumor surgery/radiotherapy (n=37, incidence=0.68 cases/100,000).

Exclusion Criteria

- To differentiate between acquired and congenital risk for HO, patients with a history of Prader-Willi syndrome (ICD-10-GM Q87.1) were excluded.

Statistical Analysis

- Resource utilization and treatment costs with 1:10-exact matched non-HO-obesity patients. Excess healthcare resource utilization (HCRU) and costs calculated for eight quarters following the index HO-associated hospitalization.

Results

HCRU of HO-patients after index hospitalization

- Patients with HO utilize healthcare resources more often than non-HO-obesity controls.
- After index hospitalization, 40% of HO patients received the diagnosis of incident obesity or diabetes insipidus during the index or follow-up hospitalization, while 34% were diagnosed at an outpatient GP visit. 26% of patients were diagnosed at other specialist groups.
- In the first year after index event: On average 4.6 excess hospitalizations in HO patients compared to non-HO-obesity patients (+2.8 excess hospitalizations in the second year, Table 1).
- Most common primary diagnosis in follow-on hospitalizations were tumor-specific diagnoses. Also common were diagnoses of other pituitary disorders (ICD-10-GM E23.6) and diabetes insipidus (ICD-10-GM E23.2).
- GPs are particularly involved in the outpatient follow-up of HO patients. Mean number of GP contacts of HO patients was 6.6 in the first year after index hospitalization and 6.7 in the second year. The mean utilization of endocrinologists/diabetologists was 1.4 contacts (year 1 post index hospitalization) and 1.1 (year 2), respectively. Within the first year, ophthalmologists were also frequently consulted (on average 1.4 contacts per HO-patient in year 1, 0.9 in year 2).

Costs of HO-patients after index hospitalization

- High mean overall costs during the index quarter of tumor surgery/radiotherapy (€25,717; SD: 33,995) in HO patients compared to non-HO-obesity patients (€886; SD: 1,853). In the HO population, these costs are almost entirely attributable to the tumor-related index hospitalization (Figure 1).
- Excess costs of HO patients compared to matched non-HO-obesity patients remained high in the first year (+€19,935) and halved in the second year (+€10,745, Table 2).

Discussion

- This is the first claims database analysis of HCRU and costs after tumor-related HO incidence, contributing to a better understanding of the disease's relevance to healthcare systems.
- This analysis allows previously reported estimates of the economics of HO to be refined.
- A more comprehensive characterization of HO patients, along with a better understanding of its clinical and economic implications, will be crucial in developing optimal treatment strategies to improve patient outcomes.

Cohort Definitions

- * Included tumor diagnoses based on ICD-10-GM 2011 to 2019-version: C96.6, D33.0, D33.2, D33.3, D33.7, D33.9, D35.2, D35.3, D43.2, D44.3, D44.4, D48.9, D76.3, Q04.8, Q85.0.
- ** Inclusion of obesity based on ICD-10-GM-codes: E66, E67, E68, R63.2, R63.5; diabetes insipidus: E23.0, E23.2, E23.3, E23.6, E23.7, P80, P81; Desmopressin prescription: ATC-code H01BA02.

Table 1. Average number of healthcare utilizations per HO patient and statistically matched non-HO obesity controls and related excess utilization based on a rolling 9-year cohort

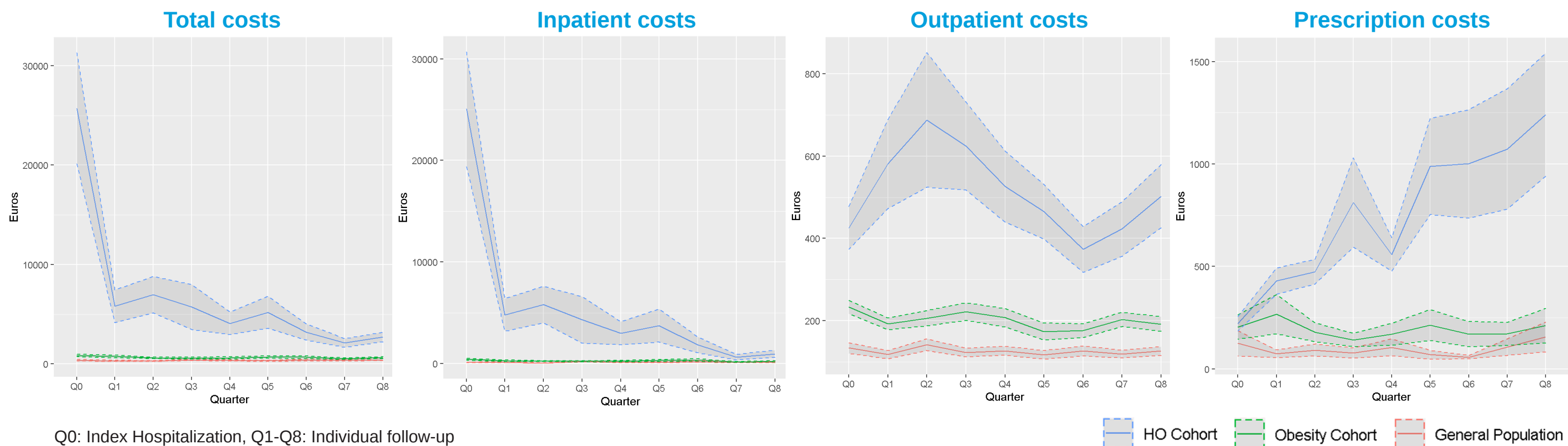
Sector	Index	Post observational period									
	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Y1	Y2
Hospitalization											
HO	2.4	1.6	1.4	1.1	1.0	0.8	0.9	0.6	1.1	5.1	3.3
Non-HO	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.5	0.5
Outpatient physician contacts											
HO	7.5	7.8	7.7	6.9	6.6	6.4	5.7	5.8	6.1	28.9	24.1
Non-HO	4.3	3.9	3.7	3.8	3.8	3.6	3.8	3.7	3.6	15.2	14.8
Prescribed pharmaceuticals											
HO	4.0	5.8	5.5	5.7	5.5	5.5	5.3	5.4	5.8	22.5	22.1
Non-HO	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	9.3	9.0
Excess HCRU											
Inpatient	+2.2	+1.5	+1.2	+1.0	+0.9	+0.6	+0.8	+0.5	+0.9	+4.6	+2.8
Outpatient	+3.2	+3.9	+3.9	+3.1	+2.9	+2.8	+2.0	+2.1	+2.5	+13.7	+9.3
Rx	+1.6	+3.4	+3.1	+3.5	+3.2	+3.3	+3.0	+3.2	+3.6	+13.1	+13.1

Q: Quarter, Y: Year

Table 2. Excess costs [€] of HO patients compared to statistically matched non-HO-obesity controls based on a rolling 9-year cohort

Sector	Index	Post observational period									
	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Y1	Y2
Overall	24,832	5,194	6,078	5,200	3,463	4,563	2,498	1,615	2,099	19,935	10,745
Inpatient	24,566	4,534	5,237	4,115	2,739	3,495	1,469	493	777	16,624	6,154
Out-patient	193	389	482	402	319	292	198	220	311	1,592	1,020
Rx	16	163	294	672	389	773	831	902	1,029	1,518	3,535

Figure 1. Mean costs [€] per HO patient and statistically matched non-HO-obesity controls and general population-controls based on a rolling 9-year cohort



Q0: Index Hospitalization, Q1-Q8: Individual follow-up

- Patients with HO utilize healthcare resources more often than non-HO-obesity controls. Excess costs of HO patients are high in the first year after tumor-related surgery/radiotherapy and halve in the second year.
- Depending on the healthcare sector, HO patients show varying cost trajectories after tumor-related hospitalization with constantly rising prescription pharmaceutical costs.

Disclosures: This study was funded by Rhythm Pharmaceuticals. Rhythm reviewed and provided feedback to the authors, but the authors had full editorial control and provided their final approval of all content. NT is an employee of Rhythm Pharmaceuticals. JW, BS and MW are employees of Vandage, which was paid by Rhythm Pharmaceuticals to conduct this research. JW owns shares of Vandage. MF received grants from Vandage. BJ, BS, HLM received no project specific grants.
Data availability: Project-specific access to an anonymized, selected study data set for the analyses was provided by the GWQ ServicePlus AG. The data analyzed in this study are not publicly available due to data protection regulations and national legislation. All data-related processes of Vandage are under the data protection supervision of an external data protection officer.