EPH240

Quantifying the disease burden of locally advanced or metastatic urothelial cancer using a disability-adjusted life years estimation approach: findings from a retrospective observational study in Sweden

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CONCLUSIONS

- Findings from this retrospective observational study demonstrate that locally advanced or metastatic urothelial carcinoma (la/mUC) was associated with a substantial burden of disease in Sweden, resulting in a considerable loss of healthy life years at the population level
- A total of 23,921 disability-adjusted life years (DALYs) were attributed to la/mUC, corresponding to an average of 11.8 DALYs per patient, during the study period, highlighting the significant societal impact of the disease
- More than 22,000 years of life were lost due to UC-related deaths, demonstrating the severe impact of la/mUC on life expectancy
- The contribution of years lived with disability (YLD) was relatively small compared with years of life lost (YLL), reflecting the poor survival associated with advanced disease
- Overall, the DALY analysis demonstrates that la/mUC imposes a substantial public health burden in Sweden, with the majority of this burden arising from early mortality following diagnosis
- The large contribution of premature mortality to total disease burden suggests that interventions capable of delaying disease progression or extending survival could generate meaningful population-level benefits

PLAIN LANGUAGE SUMMARY

- Advanced urothelial cancer places a considerable burden on people and society in Sweden due to its impact on the overall health of people and how long they live
- In this study, researchers looked at the burden of advanced urothelial cancers on the population in Sweden and how it impacted rates of disability and death using disability-adjusted life years
  - Disability-adjusted life years are a public health metric that show the overall burden of disease as the number of years lost to ill health, disability, or early death
- During the study period, advanced urothelial cancer was responsible for 23,921 disability-adjusted life years, showing the significant impact of the disease on society
- More than 22,000 years of life were lost because of urothelial cancer-related deaths, highlighting the serious effect on how long people live
- Years lived with disability contributed to only a small part of the overall disease burden, mainly because many people died soon after diagnosis
- Overall, the disability-adjusted life years analysis showed that advanced urothelial cancer places a substantial burden on public health in Sweden, with most of this burden resulting from early death
- Because premature death accounted for most of the disease burden, treatments that delay disease progression or help people live longer could have a meaningful impact on population health

BACKGROUND

- UC is the most common type of bladder cancer, and patients with la/mUC often face poor clinical outcomes and substantial healthcare needs[1]
- Traditional measures such as incidence, prevalence, and mortality do not fully capture the overall impact of a disease on patients and society. Burden-of-disease analyses provide a broader assessment by measuring both premature death and time spent in poor health
- DALYs combine YLL and YLD into a single measure of health loss. By integrating mortality and morbidity, DALYs enable comparisons of disease burden across populations, time periods, and disease areas[2]
- Understanding the relative contributions of premature mortality and disability may help identify where improvements in patient outcomes could have the greatest impact

Study objectives

- This study used a DALY framework to quantify the population-level burden of la/mUC in Sweden and assess the contribution of mortality and disability to overall health loss
- Specifically, this study aimed to estimate YLL due to premature mortality, estimate YLD, and calculate DALYs among patients with la/mUC

METHODS

- The burden of disease associated with la/mUC was quantified using DALYs, a composite measure that captures both premature mortality and disability
- DALYs were calculated as the sum of YLL and YLD: DALYs = YLL + YLD
- YLL were estimated by multiplying the number of all-cause deaths by the remaining life expectancy at the age of death, thereby quantifying the burden attributable to premature mortality; life expectancy was retrieved from the Human Mortality Database[3]
- YLD were estimated by combining disease duration with published disability weights, reflecting the health loss experienced while living with la/mUC[4]
- Patients with incident la/mUC and deaths were identified using nationwide Swedish population and healthcare registers, ensuring comprehensive coverage of the target population
- Burden estimates were calculated for the study period 2006-2021, allowing assessment of the cumulative impact of la/mUC in Sweden
- Analyses were stratified by age group and sex to characterize how the burden of disease varied across patient populations

RESULTS

- From 2006-2021, there were 2,026 patients with incident la/mUC and 1,114 UC-related deaths (death with any of the *International Classification of Diseases, Tenth Revision* codes from category C67 as an underlying or contributing cause); baseline characteristics are shown in **Table 1**
- Over the same period, there was a total of 22,030.66 YLL, 1,890.55 YLD, and 23,921.21 DALYs, corresponding to an average of 11.81 DALYs per patient (**Table 2**)
- Noneconomic disease burden was generally highest in male patients and age groups 60-69 and 70-79 years
- Male patients aged 70-79 years contributed 4,565.37 YLL, 580.93 YLD, and 5,146.30 DALYs, while female patients aged 70-79 years contributed 2,628.47 YLL, 228.72 YLD, and 2,857.19 DALYs
- The trend was variable in the 30-49 years age group where YLL and DALYs were higher in female patients, but YLD were higher in male patients

Table 1. Patient baseline characteristics

	Patients with la/mUC (N=2,026)
Age at index date, years	
Mean (SD)	73.1 (10.4)
Median (Q1-Q3)	74.1 (67.0-80.4)
Range	18.2-98.3
Sex, n (%)	
Female	664 (32.8)
Male	1,362 (67.2)
Index year, n (%)	
2006-2010	478 (23.6)
2010-2015	591 (29.2)
2016-2021	957 (47.2)

la/mUC, locally advanced or metastatic urothelial carcinoma; **Q**, quartile.

Table 2. Summary of noneconomic burden of disease, by sex and age group

Sex/age group	Incident patients, n	All-cause deaths, n	UC-related deaths, n	YLL	YLD	DALY
Total	2,026	1,681	1,114	22,030.66	1,890.55	23,921.21
All patients						
18-29	1	1	1	63.60	2.59	66.19
30-49	55	42	28	1,610.03	62.66	1,672.69
50-59	159	129	84	3,387.94	192.81	3,580.75
60-69	488	388	267	7,004.92	547.19	7,552.11
70-79	797	638	400	7,193.84	809.65	8,003.49
80+	526	483	334	2,770.33	275.66	3,045.99
Male patients						
30-49	27	16	11	613.65	43.55	657.20
50-59	102	81	57	2,030.08	128.20	2,158.28
60-69	333	262	180	4,491.44	374.24	4,865.68
70-79	552	427	284	4,565.37	580.93	5,146.30
80+	348	318	221	1,699.12	195.51	1,894.63
Female patients						
18-29	1	1	1	63.60	2.59	66.19
30-49	28	26	17	996.38	19.11	1,015.49
50-59	57	48	27	1,357.86	64.60	1,422.46
60-69	155	126	87	2,513.48	172.94	2,686.42
70-79	245	211	116	2,628.47	228.72	2,857.19
80+	178	165	113	1,071.21	80.15	1,151.36

DALY, disability-adjusted life year; **UC**, urothelial carcinoma; **YLD**, years lived with disability; **YLL**, years of life lost.

STRENGTHS AND LIMITATIONS

Strengths

- The analysis quantified disease burden using established public health measures, including YLL, YLD, and DALYs, allowing the impact of la/mUC to be assessed beyond traditional survival outcomes
- Nationwide Swedish registry data were used to identify patients with incident la/mUC and deaths, providing comprehensive population-level coverage and minimizing selection bias
- The burden of disease was assessed over a long study period (2006-2021), enabling evaluation of the cumulative impact of la/mUC on the Swedish population
- The analysis captured both mortality and morbidity components of disease burden, providing a more holistic assessment of the impact of la/mUC than mortality measures alone
- Use of DALYs facilitates comparisons with other diseases and public health conditions, supporting healthcare prioritization and resource allocation decisions

Limitations

- YLD estimates relied on assumptions regarding disability weights and health states, which may not fully reflect the lived experience or quality-of-life impact of la/mUC in Swedish patients
- The YLD analysis may underestimate the true burden of morbidity, as the available data did not capture changes in disease severity over time explicitly. Therefore, worsening health status associated with disease progression may not be fully reflected in the applied disability weights
- DALY estimates are descriptive, and estimates for age groups with small sample sizes should be interpreted with caution due to greater uncertainty
- The analysis did not incorporate patient-reported outcomes or health-related quality-of-life data, limiting the ability to capture the full impact of symptoms and treatment burden
- Registry-based analyses are dependent on the accuracy and completeness of diagnosis and mortality coding, which may result in some degree of misclassification

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