Real-world Patient Characteristics and Patterns of Care among Metastatic Urothelial Cancer, Head and Neck Squamous Cell Carcinoma and Non-small Cell Lung Cancer Patients using a German Sickness Fund Claims Database

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Background

- Despite advances in cancer therapy, patients with metastatic urothelial cancer (mUC), metastatic head and neck squamous cell carcinoma (mHNSCC) or metastatic non-small cell lung cancer (mNSCLC) still have poor survival and outcomes
- Bladder cancer, including UC, is the ninth most common cancer in the world.[1] In Germany, it has the fourth highest age-standardised incidence rate and a mortality rate of 3.0%.[2] It is estimated that 5-year survival for patients with metastatic disease is 5.0%[3]
- The global incidence of HNSCC in 2012 was 4.8%.[1] The age-standardised incidence rate places numerous types of HNSCC among the highest 15 of all cancers in Germany.[2] The 5-year survival rate for patients with oral cavity and/or pharyngeal cancer is 64.5%; for patients with laryngeal cancer, it is 60.7%[3]
- Lung cancer is the most common cancer globally[1] and the leading cause of cancer-related death in Germany, with an estimated 20.0% mortality rate[4]
- Over the past decade, treatment of mNSCLC has greatly improved by identifying those who may benefit from a targeted therapy or other drug regimen[5]
- The arrival of new immuno-oncology therapies could modify treatment patterns in patients with advanced and metastatic UC, HNSCC and NSCLC[6–13]

Study Objective

- The overall aim of this study was to describe patient characteristics and current treatment patterns among adults in Germany with mUC, mHNSCC or mNSCLC. This retrospective claims-based analysis examined real-world evidence on current clinical practice in the patterns of care among patients suffering from these cancers

Methods

Data

- This was a retrospective, observational study utilising administrative claims from January 2010 to December 2015 of the *Betriebskrankenkassen* German Sickness Fund

mUC, mHNSCC and mNSCLC Patient Selection

- Patients were selected based on evidence of at least one inpatient claim or two outpatient claims within 1 year of each other for an assured ICD-10-GM diagnosis code of interest (marked by 'G' or 'Z'), with a first qualifying claim in a quarter (i.e. identification quarter) between January 2011 and December 2014
- For inclusion in the mUC cohort, patients had to meet at least one of the following criteria:
  - Malignant neoplasm of the renal pelvis (C65) and removal of a kidney, or
  - Malignant neoplasm of the bladder (C67*) or neoplasm of uncertain or unknown behaviour of urinary organs: bladder (D41.4) and either removal of the urinary bladder or chemotherapy, or
  - Malignant neoplasm of the ureter (C66) and treatment with an antineoplastic agent, or
  - Malignant neoplasm of other and unspecified urinary organs: urethra (C68.0) and treatment with an antineoplastic agent
- For inclusion in the mHNSCC cohort, patients had to meet all of the following criteria:
  - Head and neck cancer (C01, C02, C03, C04, C06, C10, C13, C32) and
  - Treatment with a specific antineoplastic agent
- For inclusion in the mNSCLC cohort, patients had to meet all of the following criteria:
  - Lung cancer (C34), and
  - Treatment with an antineoplastic agent which was an NSCLC-specific agent, and
  - No evidence of an excluded agent
- For all cohorts, patients had to meet the following additional criteria:
  - 12 months of continuous insurance enrolment prior to and during the index quarter, and
  - No medical or pharmacy claim(s) indicative of cancer therapy prior to their first qualifying diagnosis claim, and
  - Aged 18 years or older, and
  - Evidence of metastases (C77*, C78*, C79*)

Data Analysis

- Patient characteristics at the time of metastatic cancer diagnosis:
  - Age
  - Sex
  - Comorbidities
  - Charlson comorbidity index (CCI)
- Treatment information:
  - First-line therapy agents and regimen, defined as monotherapy and combination therapy initially prescribed following diagnosis with metastatic cancer
  - Therapeutic agents ever used following diagnosis with metastatic cancer until death, end of study data or loss to follow-up
- Patient demographic and clinical characteristics were evaluated using:
  - Percentages and frequencies for categorical variables
  - Means and standard deviations (SD) for continuous variables

Results

- Patients with mUC, mHNSCC and mNSCLC were predominantly male, with a mean age of 69.4 (SD 9.9), 61.4 (9.9) and 65.3 (10.1) years, respectively (**Table 1**)
- Patients with mUC had a mean CCI of 3.7 (SD 2.4), most frequently reporting diabetes without chronic complication (**Table 2**)
  - Patients with mHNSCC and mNSCLC had a mean CCI of 2.7 (2.6) and 3.2 (3.0), respectively, with chronic pulmonary disease most commonly reported for each (**Table 2**)
- Just below 50% of patients with mUC were prescribed chemotherapy. The most commonly prescribed treatment regimens were monotherapy pyrimidine analogues and combination therapy pyrimidine analogues with platinum compounds (**Figure 1**; **Table 3**)
- Patients with mHNSCC were most frequently prescribed monotherapy (69.4%), with platinum compounds being the most commonly prescribed regimen (**Figure 1**; **Table 4**)
- Combination therapy was prescribed in 47.9% of mNSCLC patients; the most common combination regimen was vinca alkaloids/analogues with platinum compounds (**Figure 1**; **Table 5**)
- Pyrimidine analogues (33.6%) followed by platinum therapy (24.1%) were the preferred antineoplastic therapies for mUC patients. Platinum compounds were the most frequently prescribed antineoplastic agents for patients with mHNSCC (64.8%) and mNSCLC (48.2%) (**Table 6**)

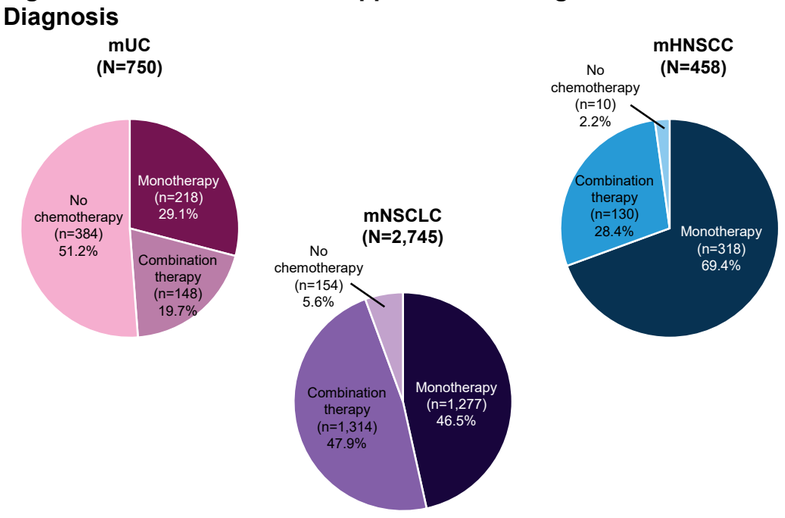
Table 1. Demographic Characteristics at Metastatic Cancer Diagnosis

	mUC (N=750)	mHNSCC (N=458)	mNSCLC (N=2,745)
Age, years			
Mean (SD)	69.4 (9.9)	61.4 (9.9)	65.3 (10.1)
Median (Q1–Q3)	71.0 (63.0–77.0)	61.0 (55.0–68.0)	66.0 (58.0–73.0)
Age group, % (n)			
18–24	0.0 (0)	0.0 (0)	0.1 (2)
25–34	0.1 (1)	0.9 (4)	0.1 (2)
35–44	0.4 (3)	2.6 (12)	2.0 (56)
45–54	9.1 (68)	19.2 (88)	13.2 (361)
55–64	18.9 (142)	41.7 (191)	30.7 (843)
65–74	37.1 (278)	25.1 (115)	34.1 (936)
75+	34.4 (258)	10.5 (48)	19.9 (545)
Gender, % (n)			
Male	72.1 (541)	79.7 (365)	65.7 (1,804)
Female	27.9 (209)	20.3 (93)	34.3 (941)

Table 2. Clinical Characteristics at Metastatic Cancer Diagnosis

	mUC (N=750)	mHNSCC (N=458)	mNSCLC (N=2,745)
Comorbidity, % (n)			
Tumour	73.6 (552)	44.3 (203)	39.4 (1,082)
Chronic pulmonary disease	24.3 (182)	26.0 (119)	44.4 (1,220)
Diabetes without chronic complication	29.3 (220)	18.8 (86)	24.3 (668)
Peripheral vascular disease	18.1 (136)	16.4 (75)	23.8 (654)
Mild liver disease	15.1 (113)	22.1 (101)	15.2 (416)
Cerebrovascular disease	16.9 (127)	11.1 (51)	14.5 (397)
Congestive heart failure	15.7 (118)	8.7 (40)	13.3 (365)
Diabetes with chronic complication	12.3 (92)	8.1 (37)	8.6 (237)
Renal disease	25.5 (191)	5.9 (27)	8.9 (244)
Myocardial infarction	7.5 (56)	5.5 (25)	7.8 (214)
Rheumatic disease	2.7 (20)	2.4 (11)	2.9 (80)
AIDS/HIV	0.0 (0)	0.0 (0)	0.1 (2)
CCI, mean (SD)	3.7 (2.4)	2.7 (2.6)	3.2 (3.0)

Figure 1. First-line Treatment Approach following Metastatic Cancer Diagnosis



initial treatment approaches prescribed following diagnosis with metastatic cancer.

Table 3. mUC First-line Treatment Regimens following Metastatic Cancer Diagnosis

	mUC (N=750)
No chemotherapy, % (n)	51.2 (384)
Monotherapy, % (n)	
Pyrimidine analogues	16.5 (124)
Vinca alkaloids/analogues	4.0 (30)
Other cytotoxic antibiotics	2.9 (22)
Platinum compounds	2.3 (17)
Other monotherapy	3.3 (25)
Combination therapy, % (n)	
Pyrimidine analogues and platinum compounds	14.3 (107)
Other combination therapy	5.5 (41)

Therapeutic regimens initially prescribed following diagnosis with metastatic cancer.

Table 4. mHNSCC First-line Treatment Regimens following Metastatic Cancer Diagnosis

	mHNSCC (N=458)
No chemotherapy, % (n)	2.2 (10)
Monotherapy, % (n)	
Platinum compounds	33.8 (155)
Monoclonal antibodies	25.1 (115)
Taxanes	7.6 (35)
Other monotherapy	2.8 (13)
Combination therapy, % (n)	
Pyrimidine analogues and platinum compounds	10.9 (50)
Pyrimidine analogues, platinum compounds and monoclonal antibodies	6.1 (28)
Taxanes and platinum compounds	3.1 (14)
Other combination therapy	8.3 (38)

Therapeutic regimens initially prescribed following diagnosis with metastatic cancer.

Table 5. mNSCLC First-line Treatment Regimens following Metastatic Cancer Diagnosis

	mNSCLC (N=2,745)
No chemotherapy, % (n)	5.6 (154)
Monotherapy, % (n)	
Folic acid analogues	19.2 (528)
Protein kinase inhibitors	7.0 (191)
Vinca alkaloids/analogues	6.7 (184)
Taxanes	5.9 (163)
Pyrimidine analogues	5.0 (138)
Other monotherapy	2.7 (73)
Combination therapy, % (n)	
Vinca alkaloids/analogues and platinum compounds	12.0 (330)
Folic acid analogues and platinum compounds	11.8 (325)
Taxanes and platinum compounds	9.1 (249)
Pyrimidine analogues and platinum compounds	5.2 (142)
Folic acid analogues, platinum compounds and monoclonal antibodies	2.6 (71)
Other combination therapy	7.2 (197)

Therapeutic regimens initially prescribed following diagnosis with metastatic cancer.

Table 6. All Antineoplastic Agents Prescribed for Monotherapy or Combination Therapy following Metastatic Cancer Diagnosis

	mUC (N=750)	mHNSCC (N=458)	mNSCLC (N=2,745)
Antineoplastic agents, % (n)			
Platinum compounds	24.1 (181)	64.8 (297)	48.2 (1,323)
Folic acid analogues	1.5 (11)	3.1 (14)	44.2 (1,214)
Taxanes	7.1 (53)	24.2 (111)	31.1 (854)
Pyrimidine analogues	33.6 (252)	28.4 (130)	20.2 (555)
Vinca alkaloids/analogues	11.3 (85)	3.5 (16)	26.1 (717)
Protein kinase inhibitors	1.7 (13)	0.7 (3)	20.6 (566)
Monoclonal antibodies	1.9 (14)	45.2 (207)	12.9 (354)
Other cytotoxic antibiotics	1.3 (10)	1.3 (6)	–
Podophyllotoxin derivatives	1.2 (9)	0.9 (4)	–
Anthracyclines and related substances	0.9 (7)	0.4 (2)	–
Other antineoplastic agents	0.8 (6)	0.9 (4)	<0.1 (1)
Nitrogen mustard analogues	0.3 (2)	0.4 (2)	–
Nitrosoureas	–	–	<0.1 (1)
Other alkylating agents	–	–	<0.1 (1)
Other plant alkaloids and natural products	0.1 (1)	–	–

Therapeutic agents prescribed at any time following diagnosis with metastatic cancer until death, end of study data or loss to follow-up. Patients may receive multiple agents during the follow-up period, so column totals may not sum to 100%.

Conclusions

- Patients with mUC were split almost evenly between non-chemotherapy and chemotherapy regimens, while those with mHNSCC and mNSCLC were predominantly prescribed monotherapy and combination therapy regimens, respectively
- Pyrimidine analogues were the preferred therapies for mUC patients treated with antineoplastic agents, while platinum compounds were preferred for patients with mHNSCC and mNSCLC
- Treatment patterns reported for this study adhered to German guidelines[14–20]
- The disease burden, coupled with the poor prognosis of each of these tumour types, suggests an ongoing need for more effective therapies
- Recent approval of immuno-oncology therapies provides a promising treatment approach for patients with these diseases
- There are some limitations to this study:
  - The specificity of dates for all claims is limited, as only year and quarter are available (the month and day are unknown)
  - Data are from 2010 to 2015 and may not be reflective of current trends
  - Analyses are limited to first-line treatment only and some treatment information is not available, including duration of therapy cycles

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