Histotype-specific survival analysis of invasive urothelial carcinoma

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Introduction

In Germany, urinary bladder cancer is ranked 4th among men and 12th among women regarding incidence. Urothelial carcinomas account for the largest proportion of all urinary bladder carcinomas with 90% to 95%. Rare histological subtypes, such as squamous cell carcinoma, pure adenocarcinoma and pure neuroendocrine cancer, which can be grouped as non-urothelial neoplasms, should be distinguished. There is still very little data on the rare non-urothelial subtypes. Therefore, we analysed the survival of urothelial carcinomas and non-urothelial neoplasms regarding the T-stage.

Methods

- All patients diagnosed with urinary tract neoplasms (ICD-10: C65-C68) in NRW from 2008 to 2019 were included
- Non-invasive, unspecified (e.g., 8000/3) and very rare variants (amount <5) were excluded
- Non-urothelial cancers have been classified according to the WHO Classification of 2016 as squamous cell carcinoma (SCC), pure adenocarcinoma (ADC) and pure neuroendocrine cancer (NEC)
- ICD-O-3 code 8130/3, papillary urothelial carcinoma (PUC), was examined individually due to a favorable prognosis
- All Patients were classified into four stages based on T-Stage (T1-T4)
- Overall survival (OS) was analysed using the Kaplan-Meier method
- The LKR curated data for pathology and outcome

Results

A total of 50,399 patients with invasive urinary tract cancer were examined. 32,666 had a UC, 15,327 had a PUC and 2,406 (6.8%) had pure non-urothelial carcinoma (1,172 SCC; 656 ADC; 578 NEC). 5-year OS rates were: UC 37% (CI: 36%-37%), PUC 55% (CI: 54%-56%), ADC 34% (CI: 30%-38%), SCC 27% (CI: 24%-30%) and NEC 19% (CI: 15%-23%).

In T1, PUC had a 5-year survival rate of 62% and UC of 57%. Non-UC performed worse with 44% for ADC and 31% for SCC. There were too few patients for the NEC.

In T2, ADC achieved best 5-year OS with 41% followed by PUC 38%, UC 31%, NEC 28% and SCC 27%.

In T3, SCC with 37% and PUC with 35% performed best. NEC (13%) performed poorly while UC had 27% and ADC 26%. However, after one year, ADC and PUC had better OS than UC and SCC.

In T4, the 5-year OS of SCC was 9% compared to UC 13% and PUC 17%. The 5-year survival rate for ADC was 16% and for NEC 11%, but there were few patients for these subtypes.

The 5-year OS of unknown T-Stage was: UC 38%, PUC 64%, ADC 30%, SCC 21% and NEC 11%.

Conclusion

- Patients with PUC have a better prognosis than those with UC
- Non-urothelial subtypes performed worse than UC and PUC across the T-stages while the lowest survival rates were found in SCC and NEC
- Therefore, the creation of histotype-specific research is important for the future

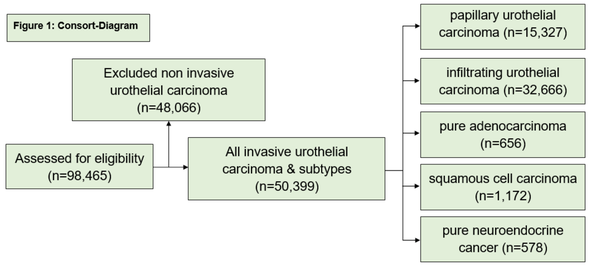
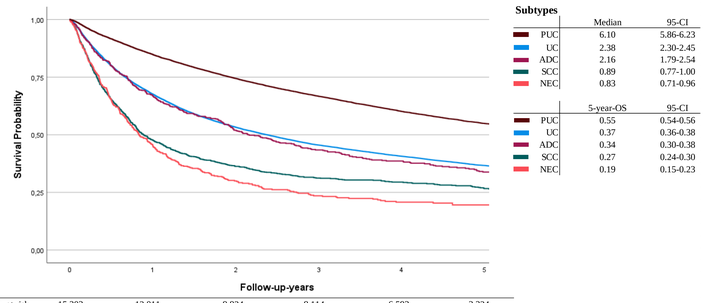


Figure 2: Kaplan-Meier curve – Overall survival subtypes

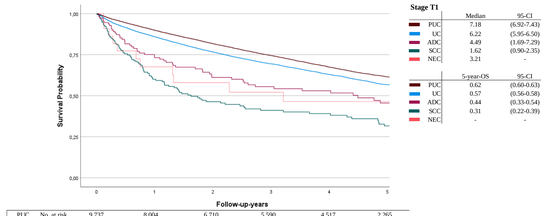


PUC	No. at risk	15,303	12,011	9,824	8,114	6,593	3,324
	(Censored)	(0)	(1,050)	(1,810)	(2,535)	(3,298)	(7,970)
UC	No. at risk	32,554	20,183	14,384	11,064	8,883	6,920
	(Censored)	(2)	(2,191)	(3,884)	(5,192)	(6,270)	(14,320)
SCC	No. at risk	1,171	509	347	270	217	172
	(Censored)	(0)	(72)	(118)	(148)	(187)	(384)
ADC	No. at risk	639	398	277	251	172	135
	(Censored)	(0)	(37)	(73)	(92)	(112)	(129)
NEC	No. at risk	552	221	125	88	63	46
	(Censored)	(0)	(41)	(66)	(77)	(93)	(152)

Table 1: Demographics and Clinical Characteristics (Percentages Organised by Column)

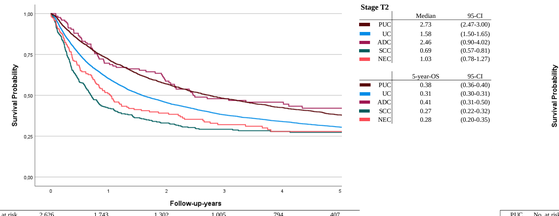
	UC, n (%)	SCC, n (%)	ADC, n (%)	NEC, n (%)	PUC, n (%)	Total, n (%)
Total	32,666 (65%)	1,172 (2%)	656 (1%)	578 (1%)	15,327 (30%)	50.399
Age, y						
< 60	4,078 (12%)	219 (19%)	145 (22%)	74 (13%)	1,935 (13%)	6,451 (13%)
60-69	6,929 (21%)	229 (20%)	168 26%)	124 (21%)	3,405 (22%)	10,855 (22%)
70-79	11,927 (37%)	353 (30%)	191 (29%)	209 (36%)	5,698 (37%)	18,378 (36%)
80+	9,732 (30%)	371 (32%)	152 (23%)	171 (30%)	4,289 (28%)	14,715 (29%)
median (IQR)	74 (66-81)	74 (64-81)	71 (61-79)	74 (66-80)	74 (66-80)	74 (66-81)
Gender						
male	23,640 (72%)	461 (39%)	375 (57%)	421 (73%)	11,988 (78%)	36,885 (73%)
female	9,026 (28%)	711 (61%)	281 (43%)	157 (27%)	3,339 (22%)	13,514 (27%)
Topography						
upper urothelial tract	3,636 (11%)	85 (7%)	36 (5%)	23 (4%)	1,799 (12%)	5,579 (11%)
lower urothelial tract	29,030 (89%)	1,087 (93%)	620 (95%)	555 (96%)	13,528 (88%)	44,820 (89%)
Grading (WHO1973)						
I	550 (2%)	51 (4%)	38 (6%)	3 (1%)	746 (5%)	1,388 (3%)
II	5,331 (17%)	514 (44%)	250 (39%)	4 (1%)	5,607 (39%)	11,706 (24%)
III	22,482 (72%)	488 (42%)	242 (38%)	388 (69%)	7,465 (52%)	31,065 (65%)
IV	1,103 (4%)	18 (2%)	9 (1%)	76 (14%)	174 (1%)	1,380 (3%)
unknown	1,762 (6%)	85 (7%)	106 (16%)	90 (16%)	497 (3%)	2,540 (5%)
T-stage						
T1	8,952 (27%)	156 (13%)	128 (20%)	29 (5%)	9,751 (64%)	19,016 (38%)
T2	11,407 (35%)	376 (32%)	132 (20%)	205 (35%)	2,629 (17%)	14,749 (29%)
T3	5,777 (18%)	260 (22%)	102 (16%)	141 (24%)	1,163 (8%)	7,443 (15%)
T4	2,449 (8%)	138 (12%)	54 (8%)	58 (10%)	269 (2%)	2,968 (6%)
unknown	4,081 (12%)	242 (21%)	240 (37%)	145 (25%)	1,515 (10%)	6,223 (12%)
N-stage						
N0	10,406 (32%)	381 (33%)	187 (29%)	179 (31%)	4,408 (29%)	15,561 (31%)
N1-N3	3,749 (11%)	133 (11%)	58 (9%)	97 (17%)	555 (4%)	4,592 (9%)
unknown	18,511 (57%)	658 (56%)	411 (63%)	302 (52%)	10,364 (68%)	3,0246 (60%)
M-Stage						
M0	8,867 (27%)	304 (26%)	142 (22%)	194 (34%)	3,932 (26%)	13,439 (27%)
M1	1,092 (3%)	53 (5%)	43 (7%)	30 (5%)	148 (1%)	1,366 (3%)
unknown	22,707 (70%)	815 (70%)	471 (72%)	354 (61%)	11,247 (73%)	3,5594 (71%)

Figure 3: Kaplan-Meier curve – Stage T1



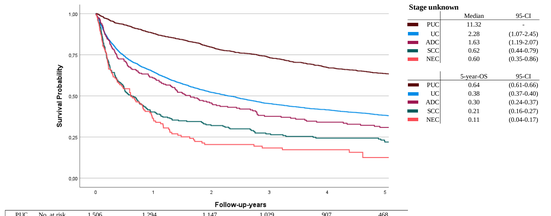
PUC	No. at risk	9,737	8,004	6,710	5,590	4,517	2,265
	(Censored)	(1)	(784)	(1,382)	(1,929)	(2,502)	(5,664)
UC	No. at risk	8,902	6,883	5,482	4,383	3,548	1,714
	(Censored)	(0)	(817)	(1,516)	(2,122)	(2,574)	(5,098)
SCC	No. at risk	156	83	57	43	38	19
	(Censored)	(0)	(14)	(22)	(30)	(33)	(56)
ADC	No. at risk	112	78	57	46	40	19
	(Censored)	(0)	(5)	(14)	(20)	(24)	(51)
NEC	No. at risk	23	14	10	9	7	2
	(Censored)	(0)	(2)	(4)	(4)	(5)	(12)

Figure 4: Kaplan-Meier curve – Stage T2



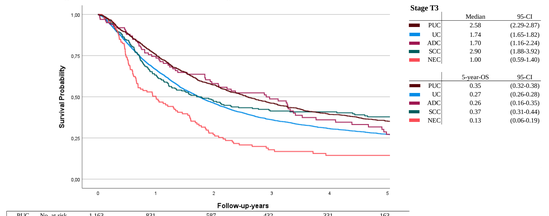
PUC	No. at risk	2,626	1,743	1,302	1,005	794	407
	(Censored)	(0)	(168)	(255)	(356)	(459)	(994)
UC	No. at risk	11,347	6,223	4,214	3,146	2,478	1,185
	(Censored)	(0)	(771)	(1,334)	(1,742)	(2,091)	(3,858)
SCC	No. at risk	376	142	99	75	53	28
	(Censored)	(0)	(25)	(39)	(52)	(71)	(112)
ADC	No. at risk	126	81	60	46	37	17
	(Censored)	(0)	(8)	(17)	(20)	(27)	(58)
NEC	No. at risk	184	82	52	37	25	12
	(Censored)	(0)	(17)	(29)	(35)	(43)	(67)

Figure 7: Kaplan-Meier curve – Stage T-unknown



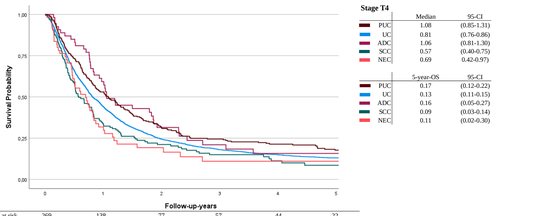
PUC	No. at risk	1,506	1,294	1,147	1,029	907	468
	(Censored)	(0)	(33)	(57)	(85)	(126)	(848)
UC	No. at risk	4,049	2,490	1,919	1,585	1,364	698
	(Censored)	(0)	(150)	(251)	(339)	(431)	(1,451)
SCC	No. at risk	241	90	64	53	46	21
	(Censored)	(0)	(9)	(17)	(18)	(20)	(58)
ADC	No. at risk	227	127	87	66	57	30
	(Censored)	(0)	(13)	(22)	(28)	(31)	(72)
NEC	No. at risk	133	43	22	17	12	4
	(Censored)	(0)	(8)	(12)	(15)	(19)	(27)

Figure 5: Kaplan-Meier curve – Stage T3



PUC	No. at risk	1,163	831	587	432	331	163
	(Censored)	(0)	(58)	(104)	(149)	(189)	(414)
UC	No. at risk	5,766	3,555	2,246	1,597	1,230	586
	(Censored)	(0)	(340)	(601)	(779)	(917)	(1,792)
SCC	No. at risk	259	149	100	81	70	35
	(Censored)	(0)	(19)	(32)	(39)	(49)	(103)
ADC	No. at risk	100	70	51	40	25	11
	(Censored)	(0)	(4)	(9)	(12)	(17)	(31)
NEC	No. at risk	127	56	30	18	12	5
	(Censored)	(0)	(10)	(11)	(13)	(16)	(26)

Figure 6: Kaplan-Meier curve – Stage T4



PUC	No. at risk	269	138	77	57	44	22
	(Censored)	(0)	(7)	(12)	(16)	(22)	(49)
UC	No. at risk	2,436	1,004	506	342	253	114
	(Censored)	(0)	(104)	(168)	(205)	(237)	(418)
SCC	No. at risk	138	44	25	17	9	3
	(Censored)	(0)	(5)	(8)	(9)	(14)	(20)
ADC	No. at risk	54	29	12	8	5	2
	(Censored)	(0)	(4)	(8)	(8)	(9)	(14)
NEC	No. at risk	55	16	7	4	4	2
	(Censored)	(0)	(3)	(6)	(6)	(6)	(10)

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