



# Bladder Cancer in Spinal Cord Injury Patients

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## Risk Factors of Bladder Cancer

- Smoking and other tobacco use
- Exposure to occupational carcinogens / radiation
  - Aromatic amines (used in dyes, rubber, textiles and some pesticides)
- Parasitic infections (Schistosomiasis)
- Neurogenic bladder dysfunction (NBD)
  - Congenital (Meningomyelocele)
  - Stroke
  - Spinal cord injury (SCI)
  - Multiple sclerosis (MS)

## Materials

2000-2016 : 106 cystectomies at ukb

- Male: 49 (46.2%)
- Female: 57 (53.8%)
- Median age at cystectomy: 65 years

| SCI | MS | non-NBD | Total |
|-----|----|---------|-------|
| 20  | 2  | 84      | 106   |

## Histology Review

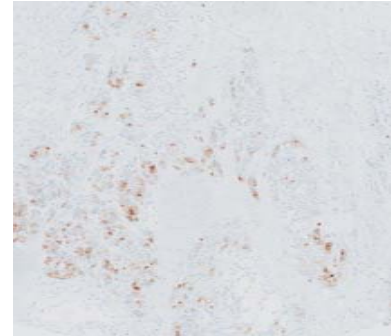
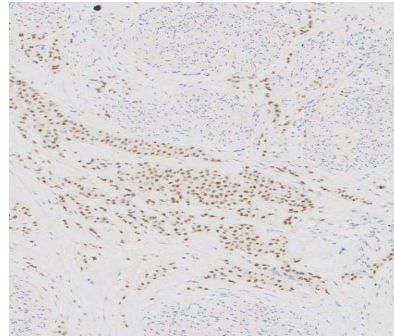
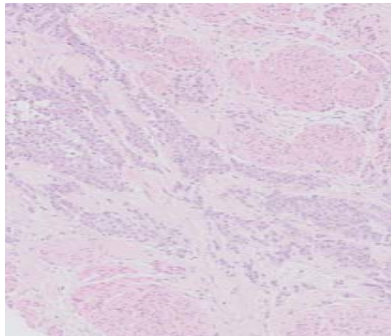
| Histology        | All | NBD | non- NBD |
|------------------|-----|-----|----------|
| TCC              | 78  | 7   | 71       |
| SCC              | 13  | 7   | 6        |
| Other carcinomas | 3   | 1   | 2        |
| Urocystitis      | 12  | 7   | 5        |
| Total            | 106 | 22  | 84       |

# Immunophenotyping

Transitional cell  
carcinoma (TCC)

GATA 3

UPK 2

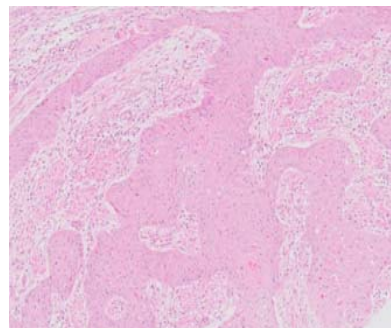


|       |           |
|-------|-----------|
| CK7   | P63       |
| CK20  | P53       |
| CK5/6 | P16       |
| GATA3 | Cyclin D1 |
| UPK2  |           |

Squamous cell  
carcinoma (SCC)

GATA 3

UPK 2



## Results

- 10/15 (67%) of pts. with neurogenic bladder dysfunction were diagnosed with an advanced tumor stage (at least pT3a)
- 45/79 (57%) of pts. without neurogenic bladder dysfunction were diagnosed with an advanced tumor stage (at least pT3a)
- No significant difference in the pathological stage between NBD and non NBD patients

## Results and Conclusion

|                               | TCC            | SCC                         | other        |
|-------------------------------|----------------|-----------------------------|--------------|
| NBD<br>% within<br>group      | 7<br>(46,7 %)  | <b>7</b><br><b>(46,7 %)</b> | 1<br>(6,7 %) |
| non- NBD<br>% within<br>group | 71<br>(89,9 %) | <b>6</b><br><b>(7,6 %)</b>  | 2<br>(2,5 %) |

p- value = 0.0002 (Fisher's exact test)

- prevalence of squamous cell carcinoma in the bladder is significantly higher in patients with neurogenic bladder dysfunction than in patients without NBD

## Hypothesis and future studies

- In NBD patients, chronic inflammation (indwelling catheters, stones and UTI) leads to a sequence of  
squamous metaplasia → dysplasia → carcinoma
- The pathophysiology and the exact contribution of the inflammatory microenvironment to tumor progression in patients with NBD and bladder cancer is not fully understood
- We will further investigate the composition of the inflammatory microenvironment in NBD bladder cancer focussing on tumour infiltrating macrophages



# Thank you

# Vielen Dank

| NBD   | All Ca. | SCC | TCC | other |
|-------|---------|-----|-----|-------|
| pT2a  | 2       | 2   | 0   |       |
| pT2b  | 3       | 1   | 2   |       |
| pT3a  | 2       | 0   | 1   |       |
| pT3b  | 4       | 1   | 3   |       |
| pT4a  | 4       | 2   | 1   | 1     |
| Total | 15      |     |     |       |

| no NBD | All Ca. | SCC | TC C | other |
|--------|---------|-----|------|-------|
| pTa    | 4       | 0   | 4    |       |
| pTis   | 1       | 0   | 1    |       |
| pT1    | 9       | 0   | 9    |       |
| pT2a   | 12      | 0   | 12   |       |
| pT2b   | 8       | 0   | 8    |       |
| pT3a   | 9       | 0   | 9    |       |
| pT3b   | 25      | 5   | 18   | 2     |
| pT4a   | 10      | 1   | 9    |       |
| pT4b   | 1       | 0   | 1    |       |
| Total  | 79      |     |      |       |