43rd Annual Ralph E. Hopkins Urology Seminars in Jackson Hole

Trends of Urinary Diversion: Declining Popularity of Continent Diversion

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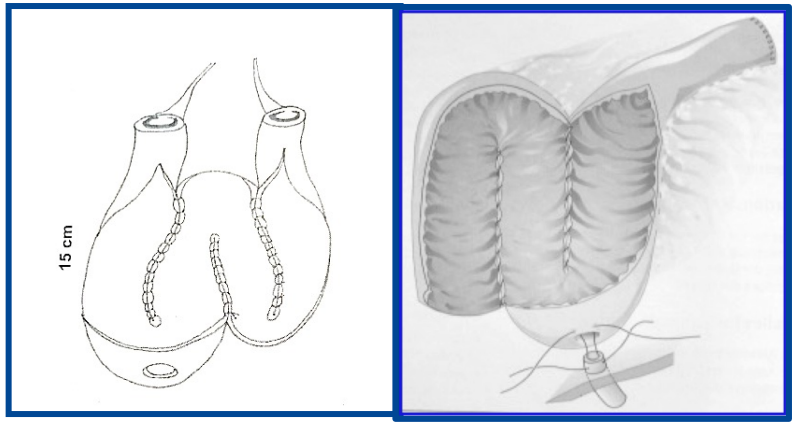
Disclosures: **none with respect to this lecture (no financial affiliations within the last two years)**

Overall ***Member of the Scientific Board / grant of AMS / Boston Scientific in the past***
Scientific Chair of meetings sponsored by Apogepha / Astellas

Introduction

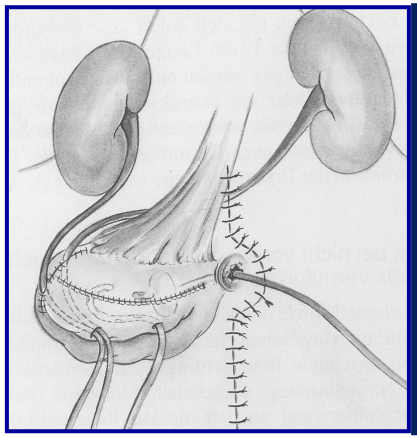
Continent urinary diversion: one of the major advances in urology in the 80th and 90th

Ileal Neobladder

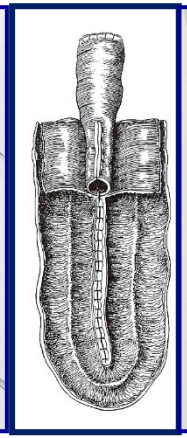


Hautmann, Studer, S-bladder

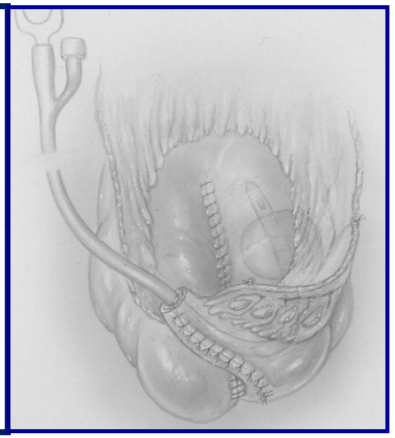
Pouch with continent Stoma



Mainz Pouch

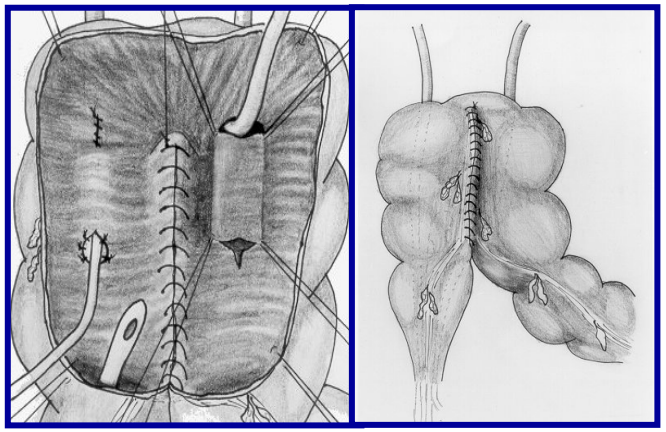


T-Pouch



Transverse Pouch

Continent low pressure anal reservoirs



Sigma-rectum Pouch

Introduction

Lowrance 2009:

- **Decline of continent urinary diversion at tertiary center (USA)**
  from 47% in 2000 to 21% in 2004

Lowrance et al., J Urol 182:2369-75 2009

- **USA (NIS dataset): continent urinary diversion**
  - **significant increase from 2001 to 2008**
  - **significant decrease from 2008 to 2012**

Farber et al., Bladder Cancer 4: 113-20, 2018

- **Germany (Destatis):**
  - **decrease from 37% in 2006 to 29% in 2014**

Groeben et al., Ann Surg Oncol 37: 180.e1-.e9, 2018

Aim & Material and Methods

To test the hypothesis that the declining trend of CUD is continuing on a nationalwide level in Germany (2005 – 2021)

Dataset:

Diagnosis Related Group billing data from Destatis (German Federal Statistical Office)
=100% of all bill procedures in Germany between 2005 and 2021

Covariables:

age, gender, annual count of procedures in each federal state

Focus:

Urinary diversion used in adults based on OPS codes

Data & Statistical Analysis:

- **Temporal distribution (Shapiro-Wilk test)**
- **Differences in CUD use (t-test or Mann-Whitney U- test)**
  - stratified by gender, age (18-69 yrs vs ≥ 70 yrs within gender groups)
- **Linear regression for trend analysis and calculation of the average estimated annual percentage change**
- **Differences in trends of CUD across different subgroups**

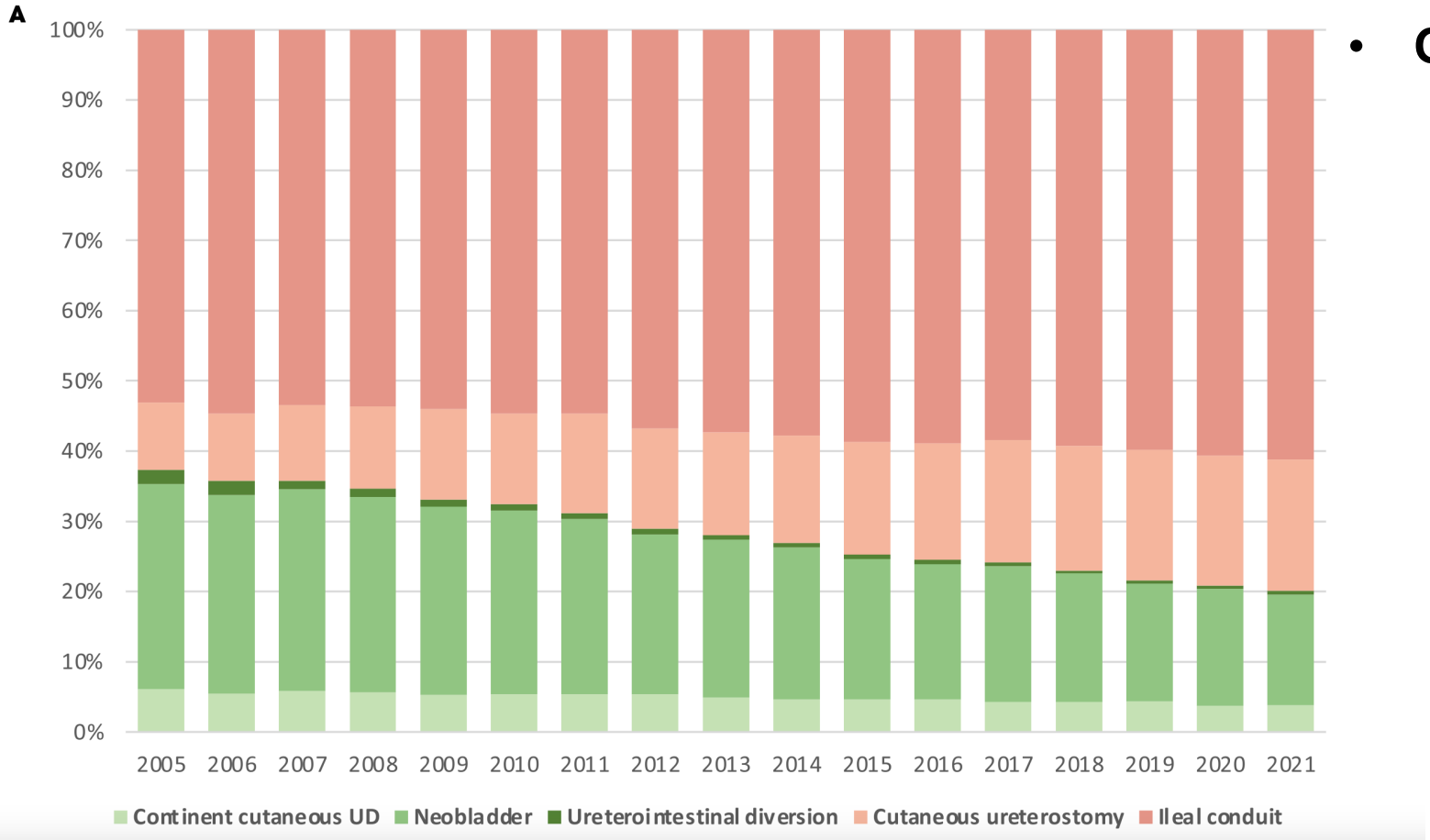
Germany 2005 - 2021

Results

157 970 urinary diversions: 28% CUD 72% IUD

increase of UD from 2005 to 2016, slight decrease to 2021

Fig. 1 (**A**) Annual proportions of continent urinary diversions (green) and incontinent urinary diversions (red) in Germany from 2005 to 2021 for patients aged ≥18 years. (**B**) Trends in continent urinary diversion use, stratified by gender and age group. UD, urinary diversion.



- **Overall decrease in CUD (p<0.001)**

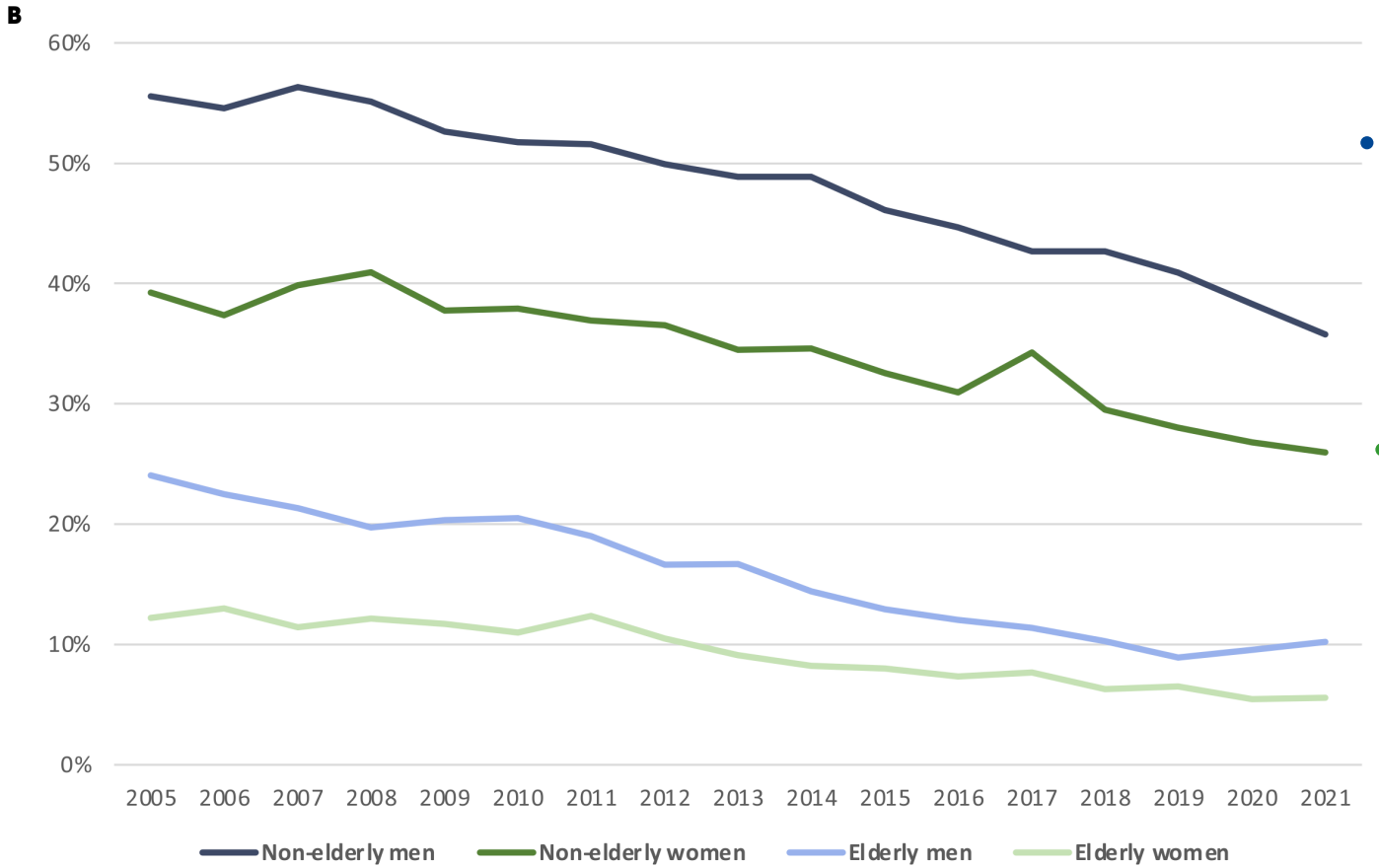
  37% to 20% **(EAPC -3.9% [95% CI 4.1% - 3.8%])**

Germany 2005 - 2021

Results

Lower annual proportion of CUD in women compared to men (p<0.001)

Constant decrease across all age groups for both gender (p≤0.001)



- **Men: steady decrease in CUD (p<0.001)**
  42% to 22% (EAPC -4.2% [95% CI – 4.3%, - 4.0%]
- **Women: steady decrease in CUD (p<0.001)**
  28% to 16% (EAPC -3.4% [95% CI - 3.8%, - 3.0%]

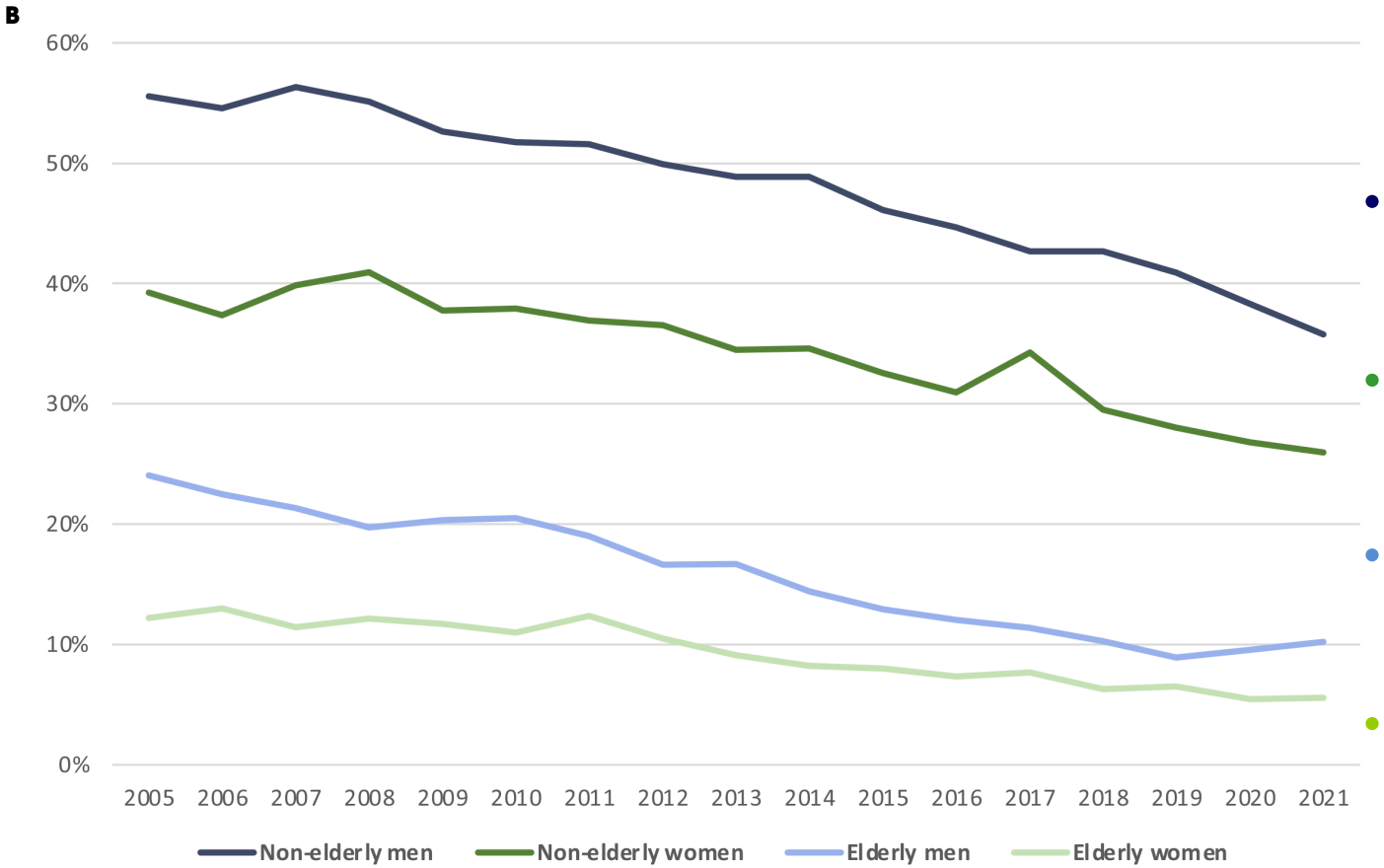
Trends in continent urinary diversion use, stratified by gender and age group

Germany 2005 - 2021

Results

Lower annual proportion of CUD in women compared to men (p<0.001)

Constant decrease across all age groups for both gender (p≤0.001)



- **Men** (18-68yrs): **decrease in CUD** (p<0.001)
  56% to 36% (EAPC -2.59% [95% CI – 2.9%, - 2.3%]
- **Women** (18-68yrs): **decrease in CUD** (p<0.001)
  39% to 26% (EAPC -2.6% [95% CI – 3.1%, - 2.1%]
- **Men** (≥ 70yrs): **decrease in CUD** (p<0.001)
  24% to 10% (EAPC -6.21% [95% CI – 6.9%, - 5.5%]
- **Women** (≥ 70yrs): **decrease in CUD** (p<0.001)
  12% to 6% (EAPC -5.5% [95% CI – 6.3%, - 4.7%]

Trends in continent urinary diversion use, stratified by gender and age group

Discussion

Reasons / arguments for an incontinent diversion

- Cystecomies performed at low volume centers / insufficiant training?
- High complication rate of CUD / lower after IUD - is this true?
- Imperfect continence after CUD / need for CIC especially in females
- Impact of the robot: learning curve / OR time / compromises about the reservoir leading to worse continence
- QOL after CUD and IUD the same so why to favour CUD?

Discussion

Too many cystectomies performed at low volume centers?

Is the new generation of urologists insufficiently trained in CUD?

US (National Cancer Database)

Median hospital volume of 12.3 cases per year

33% by surgeons with average annual volume of <2 cases

53% by surgeons with average annual volume of <5 cases

0-2 903 FAC, 3-5 748 FAC, 6-11 464 FAC 12+ 251 FAC

Waingankar et al., BJU Int 120:239, 2017

Cacciamani al., Cancers (Basel). 2022 Dec; 14(23): 5984.

Germany (Destatis)

at average 20 cystectomies per year are performed in a urology department

88 departments perform >30 a year or 50% of all cystectomies

29% CUD in 2017

Groeben et al., Eur. Urol suppl.2017 16:e466,
Ann Surg Oncol 37: 180.e1-.e9, 2018

Postoperative mortality after cystectomy is significantly inversely associated with high-volume providers.

Goossens-Lacu et al. Eur. Urol.59:775-83, 2011

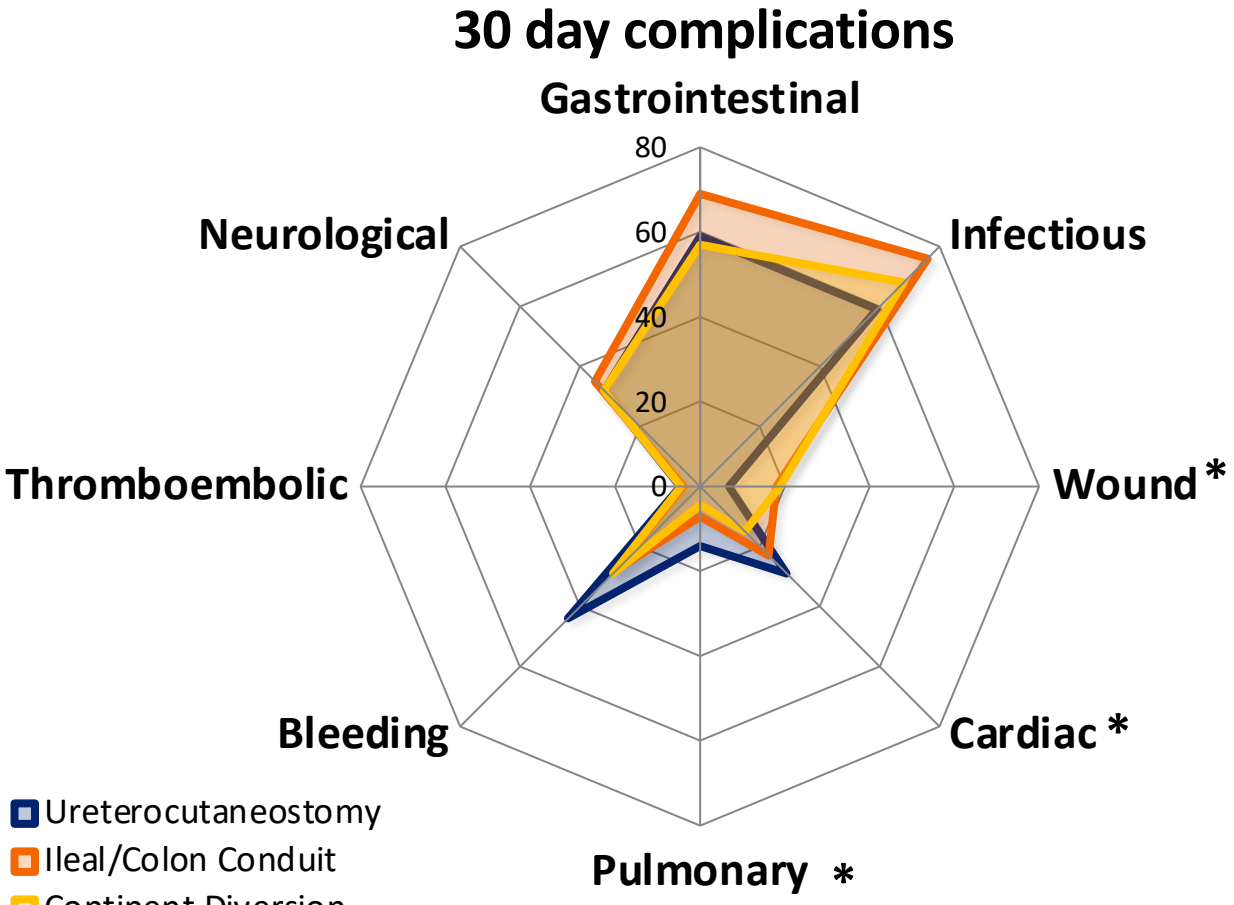
Is the % of CUD associated with high volume centers??

Is there a trend that more low volume centers perform cystectomy??

Discussion

Higher complication rate of CUD?

Radical cystectomy + pelvic lymph node dissection
01/2009 - 06/2017, n=489



* indicates a statistically significant difference ($P < 0.05$)

Data using high reported standards: Comparable morbidity, early complications

Vetterlein et al., Eur Urol Open Sci 19: e2251-2, 2020
Browne et al., Can Urol Assoc J 15: W48, 2021
Metaanalysis
Katsimperis et al. Eur Urol Focus 2023 in press

Ileal conduit: complications

N=412, 1971 – 1995, Follow-up 98 Mon.

total	**66 (%)**
kidney function /-morphology	27
stoma (stenosis, hernia)	24
bowel	24

increasing with time	**(%)**
within first 5 years	45
10 years	50
15 years	54
> 15 years	**94**

Madersbacher et al., J Urol 169:985-90, 2003

Discussion

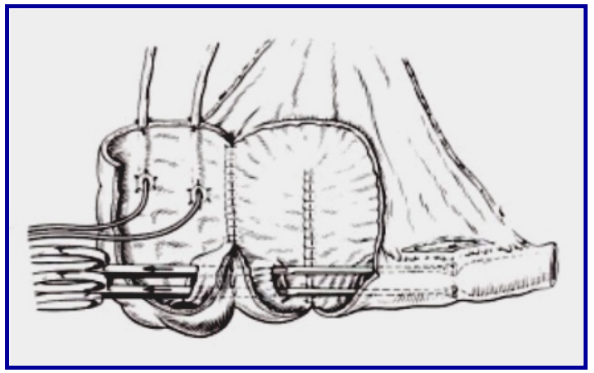
Imperfect continence of CUD?

Neobladders in Males		
daytime continence	95.9%*	54% #
nighttime continence	75.9%*	36% #

**Hautmann et al., J Urol 161, 422, 1999*
 # Kretschmer et al., J. Urol 197: 210, 2016

Neobladders in Females	RC	OrganSRC	Nerve SRC
pooled daytime continence	75.2%	79.3%	71.2%
pooled nighttime continence	59.5%	70.7%	71.7%
pooled rate of ISC	27.6%	20.6%	16.8%

Laukhtina et al., BJU Int 2023 PMID 37562831



Pouch with continent stoma		continent %
Indiana		72
Lundiana		93.7
Florida		93.3
Mainz-Pouch		
	Appendixstoma	96
	Ileal invagination nippel	89.5
Mansoura (ileum)		94.6

- Continence differently defined
- Different postop. management and rehabilitation
- Variations in surgical techniques
- Different shape and volume of the reservoir

R. Hautmann, J Urol 199,900-903, 2018

Discussion

Impact of the robot?

0% in 2006

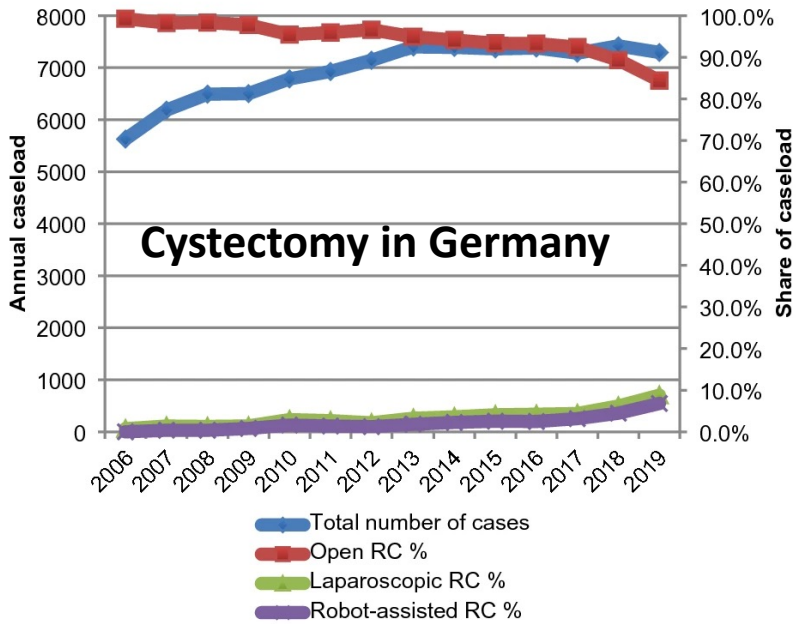
RARC +7%

6.8% in 2019

37% in 2005

CUD -17%

20% in 2021

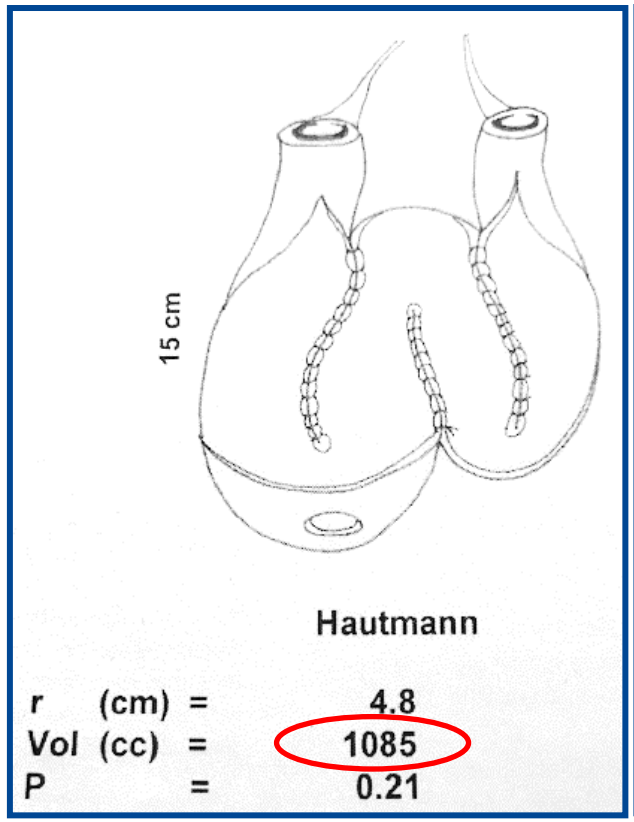


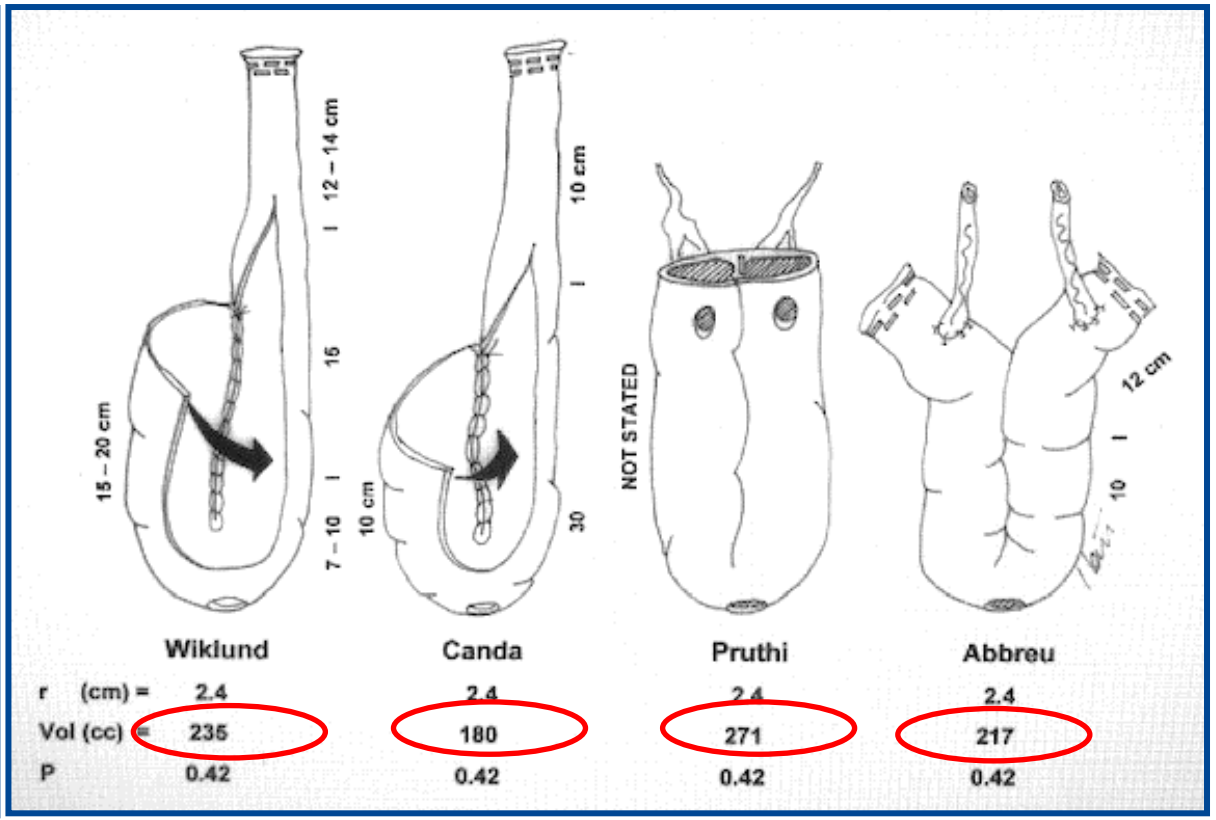
- Primary focus on radicality
- Intracorporal diversion is challenging
- Learning curve vs. case load
- CUD is time consuming
- More simple techniques have been used resulting in worse outcome

Flegar et al.,World J Urol 40(7):1715-1721, 2022

Discussion

The impact of the robot?





Piramide et al.

Systematic review

2587 studies

Only 19 included

9 different ONB types

Major variability

- complications

- outcome

Piramide et al., Eur Urol Dec 2:S0302-2838 (23)03276-1 2023

The shape and the volume of the reservoir are essential for the postoperative continence rates!

R. Hautmann, J Urol 199,900-903, 2018

Discussion

Same patient`s QOL after IUD and CUD, so why to choose CUD?

Recent reviews and metanalysis

Year	Author	Studies included	Urinary diversion	Conclusion
2016	Cerruto et al. Eur. J. Surg Oncol 42: 343	18 non-randomized	Neobladder vs ileal conduit	Significant advantage of neobladder
2016	Yang et al. Surg. Oncol. 25:281	29	Continent vs incontinent	QOL comparable, may improve
2017	Cerruto et al. Curr Urol 10:57	10	Neobladder vs ileal conduit	Significant advantage of neobladder
2018	Ziouziou et al. Prog. Urol 28:241	4 non-randomized	Neobladder vs ileal conduit	Better HR-QOL in urinary outcomes of conduit
2018	Shi et al. Qual Life Res. 27:2759	26	Neobladder vs ileal conduit	Better global health, physical function, role and social functioning of neobladder but have more postop. urinary symptoms
2022	Xing et al. Front Oncol 28; 12	4 Women	Neobladder vs ileal conduit	No difference in HRQOL

Discussion

QOL should not be an argument for the use of IUD

- Poor quality of data
- Non randomized studies
- Bias by indication for urinary diversion
- Subgroup analysis is lacking
- Complications / incontinence may have an impact on QOL
- More recent date show advantages of neobladder (males)

Conclusion

- Constant decrease of CUD in Germany across all age groups for both gender, lower percentage of CUD in females
- CUD associated with high volume centers? – no data
- Comparable morbidity and early complications of CUD and IUD in studies with high standards of reported data
- Ileal conduit has significant long-term complications (66% at 98m FU)
- Continence rates after CUD strongly depend on techniques for cystectomy, reservoir shape and surgeons experience
- Robotic assisted surgery seams to have an impact – not yet proven
- QOL should not be used as argument against CUD: bad quality of data, bias, recent data in favour of CUD

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Research Letter | Open Access

Continent diversion is losing its momentum: a nationwide trend analysis from Germany 2005–2021

Jakob Klemm, Margit Fisch, Ekaterina Laukhtina, Roland Dahlem, Shahrokh F. Shariat, Malte W. Vetterlein

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Thank You

Table 1 – Literature overview of global contemporary trends in CUD use

First Author	Year of publication	Type of dataset	Country	Procedure	Number of patients	Years evaluated	Overall CUD use and trends
Lowrance et al.[1]	2009	Institutional	United States	RC + UD	553	2000–2005	▪ CUD: 37% ▪ significant decrease from 47% in 2000 to 21% in 2004
Fedeli et al.[2]	2011	Regional HDRs	Italy (Piedmont and Veneto regions)	RC + UD	7743	2000–2008	▪ CUD: 35% ▪ significant decrease from 36% in 2000–2002 to 33% in 2006–2008
Kim et al.[3]	2013	NIS	United States	RC + UD	11 214 [weighted estimate 55 187]	2001–2008	▪ CUD: 8.2% ▪ significant increase from 6.6% in 2001–2002 to 9.4% in 2007–2008
Bachour et al.[4]	2018	ACS NSQIP	United States	RC + UD	4790	2011–2015	▪ CUD: 19% ▪ odds of undergoing IUD increased by 16% per yr
Farber et al.[5]	2018	NIS	United States	RC + UD	Weighted estimate 76 040	2001–2012	▪ CUD: 9.2% ▪ significant increase from 2001 to 2008 and significant decrease from 2008 to 2012
Groeben et al.[6]	2018	NIS Destatis	United States Germany	RC + UD	NIS: 17 711 Destatis: 60 447	2006–2014	▪ NIS: stable CUD use from 7.2% in 2006 to 6.8% in 2014 ▪ Destatis: significant decrease from 37% in 2006 to 29% in 2014
Best et al.[7]	2019	Medicare	Australia	UD	7166	1998–2017	▪ CUD: 12% ▪ stable use of CUD in 1998–2007 (12%) vs. 2008–2017 (12%)
Lin-Brande et al.[8]	2019	NCDB	United States	RC + UD	21 170	2004–2013	▪ CUD: 15% ▪ significant decrease from 17% in 2004–2006 to 12% in 2010–2013
Klemm et al.	2023	Destatis	Germany	UD	157 970	2005–2021	▪ CUD: 28% ▪ significant decrease from 37% in 2005 to 20% in 2021

ACS NSQIP = American College of Surgeons National Surgical Quality Improvement Program; CUD = continent urinary diversion; HDR = hospital discharge record; NCDB = National Cancer Database; NIS = Nationwide Inpatient Sample; RC = radical cystectomy.