

Does multivisceral resection of advanced colon & rectal cancer have an impact onto early postop. & long-term oncosurgical outcome - data obtained in a prospective multicenter observational study incl. propensity score analysis

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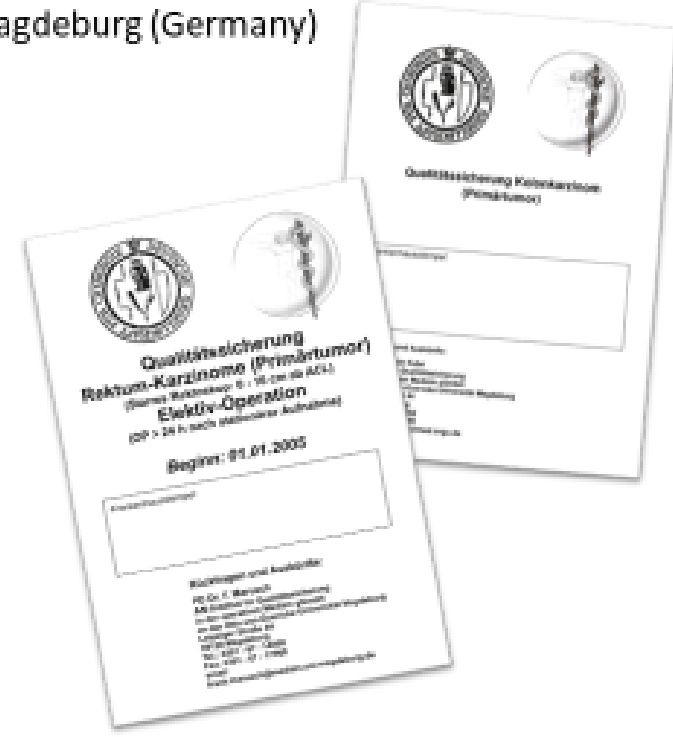
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METHODS - Patients

- Patient data of a prospective multicenter observational study for quality assurance in rectum & colon cancer(Ca) of the Institute for Quality Assurance in operative Medicine at the Otto-von-Guericke University, Magdeburg (Germany)
- Observation period: 01/01/2008 to 12/31/2015
- Data transmission from 364 participating depts.
 - 181 clinics with data on colon Ca &
 - 183 clinics with data on rectum Ca
- Inclusion of 25,321 patients
 - 15,604 colon Ca &
 - 9,717 rectum Ca patients
- Median follow-up time periods
 - Colon Ca, 45 months
 - Rectum Ca, 48 months



METHODS

- Data analysis with constant differentiation between multivisceral & conventional resection (MVR; nMVR)
- Description of patient characteristics
 - Mean, standard deviation & median for continuous variables
 - Absolute & relative frequencies for categorical variables
 - Chi-square test when testing for independence of categorical variables
 - U-test when analyzing a systematic difference of continuous variables
- Long-term data
 - Survival analysis according to Kaplan-Meier assessment with calculation of median survival time & comparison using log-rank test
 - Illustration using the Kaplan-Meier curve or one-minus survival for the recurrence rate
 - Recurrence tumor growth = local recurrence (primary Tu ste) or occurrence of distant metastases
 - Calculation of prognostic factors for overall survival using multivariate analysis

METHODS

- Matched-pair analysis
 - Propensity score matching was used to combine patients with the same characteristics from both groups (MVR; nMVR).
 - Characteristics: Gender, age, TNM-Classification & Tu location
 - Colon Ca
 - 1,410 combinations with 2,820 valid data
 - Rectum Ca
 - 822 combinations with 1,644 valid data
- Inclusion criteria
 1. Surgically treated primary colon or rectum Ca of UICC stages I-III
 2. Colon / rectum Ca with radical resection & adequate lymphadenectomy
 3. Rectum Ca with therapy using local procedures (transanal, transanal endoscopic) in the comparison group
- Exclusion criteria
 1. Stage UICC IV Ca
 2. Primary palliative resection procedures without adequate lymphadenectomy
 3. Tu diseases as a result of hereditary Ca syndromes &/or chronic intestinal diseases (FAP, ulcerative colitis, Crohn's disease)

RESULTS - MVR rate & gender

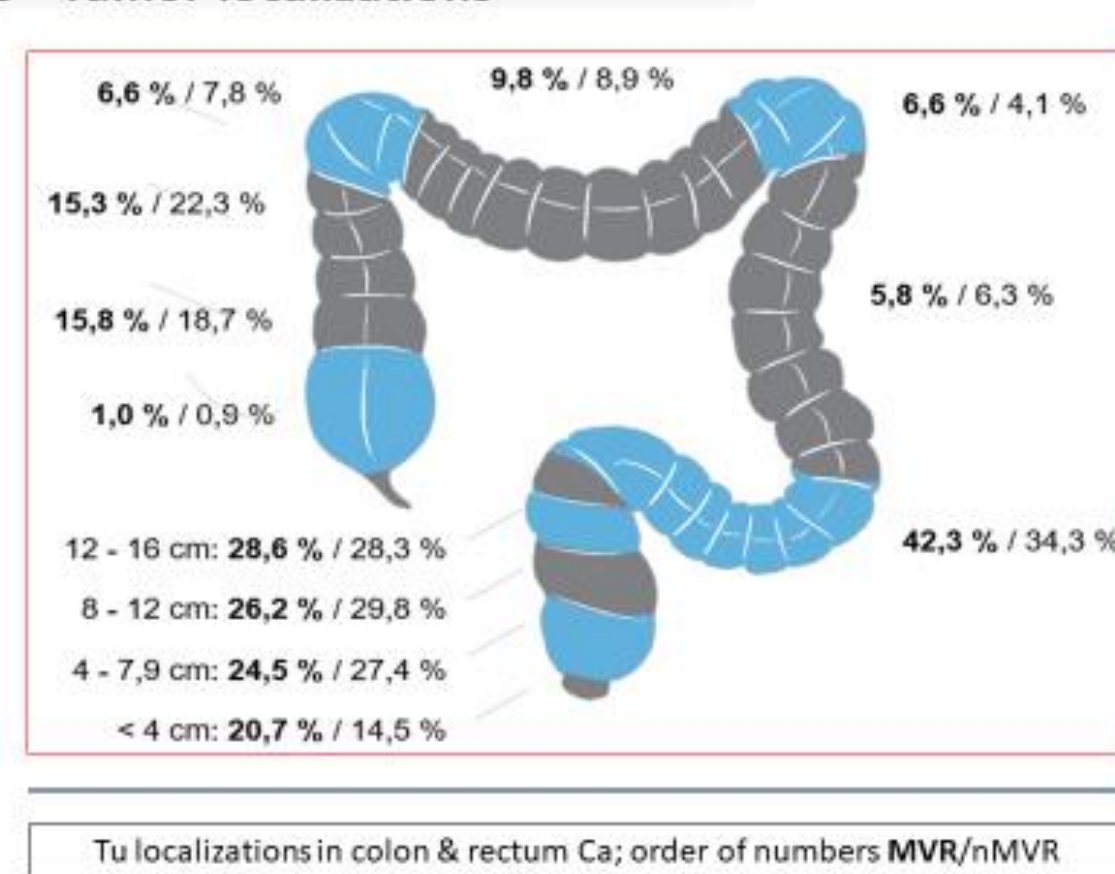
Gender distribution colon CA						
Gender	MVR		nMVR		TOTAL	
	n	%	n	%	n	%
Men	720	46.4	7,605	54.1	8,325	53.4
Women	831	53.6	6,448	45.9	7,279	46.6
TOTAL	1,551	9.9	14,053	90.1	15,604	

valid data: 15,604 / missing: 99

Gender distribution rectum CA						
Gender	MVR		nMVR		TOTAL	
	n	%	n	%	n	%
Men	460	44.8	5,562	64.0	6,022	62.0
Women	567	55.2	3,128	36.0	3,695	38.0
TOTAL	1,027	10.6	8,690	89.4	9,717	

valid data: 9,780 / missing: 63

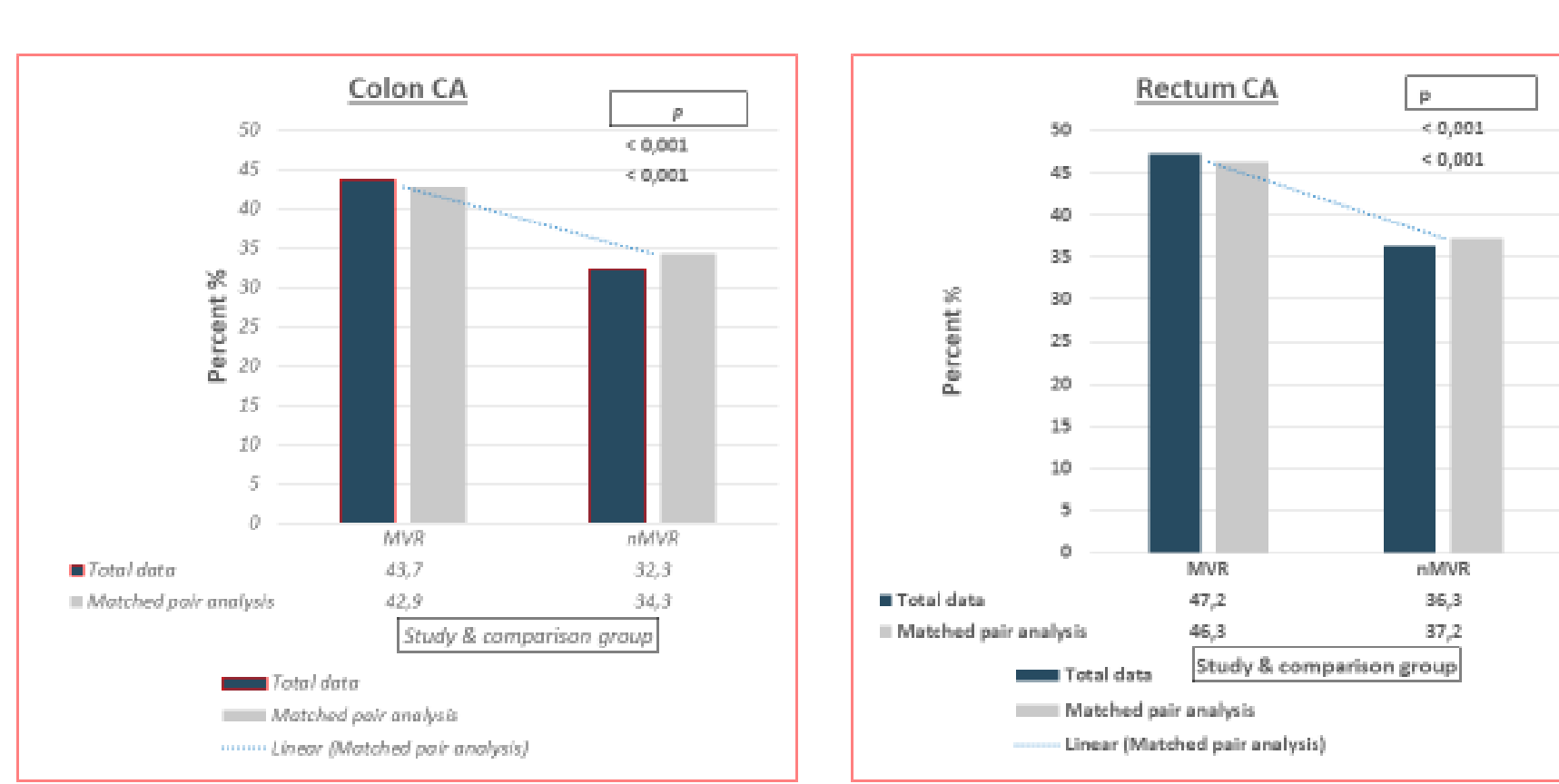
RESULTS - Tumor localizations



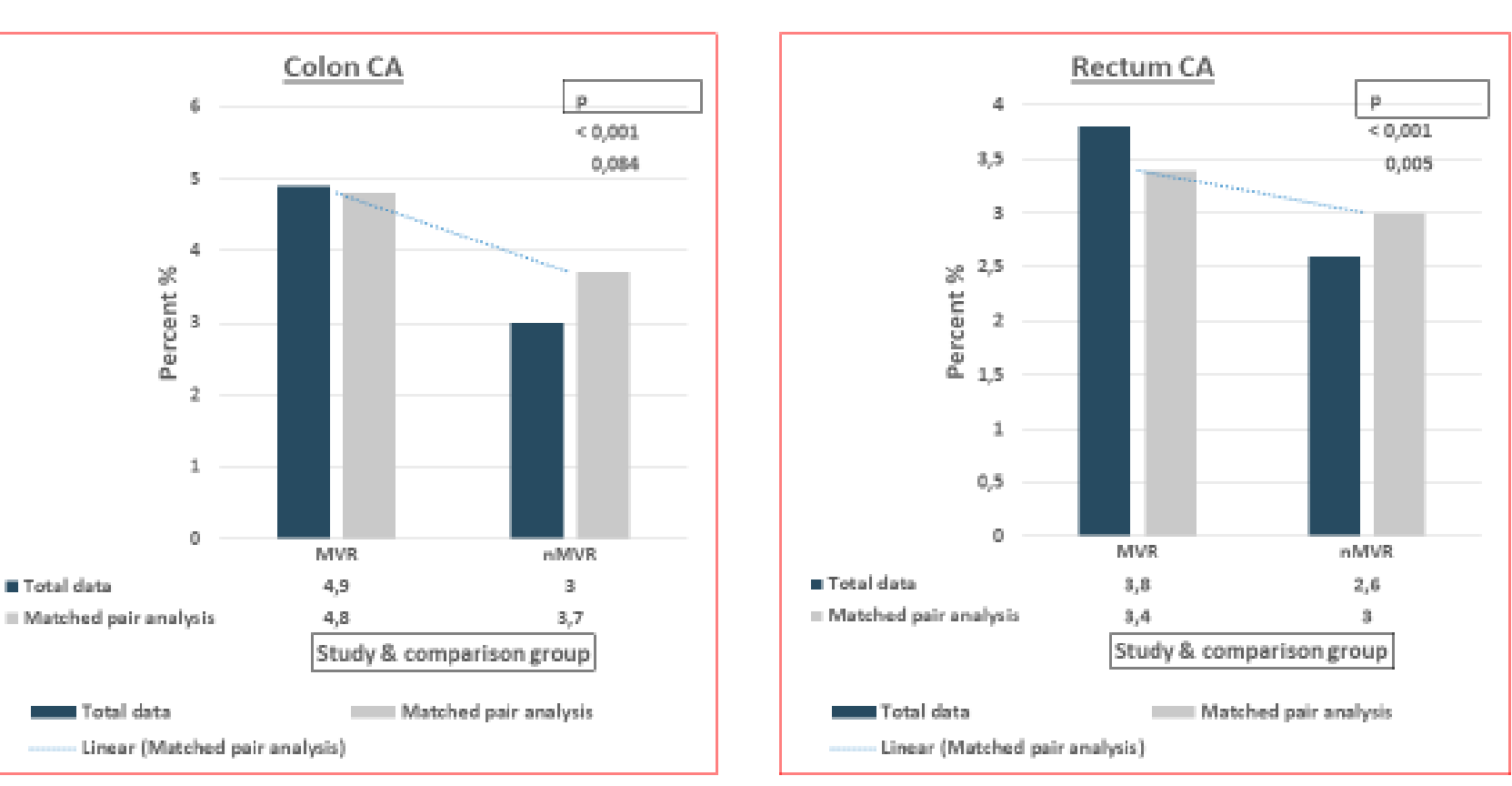
RESULTS - Postoperative histopathological classification



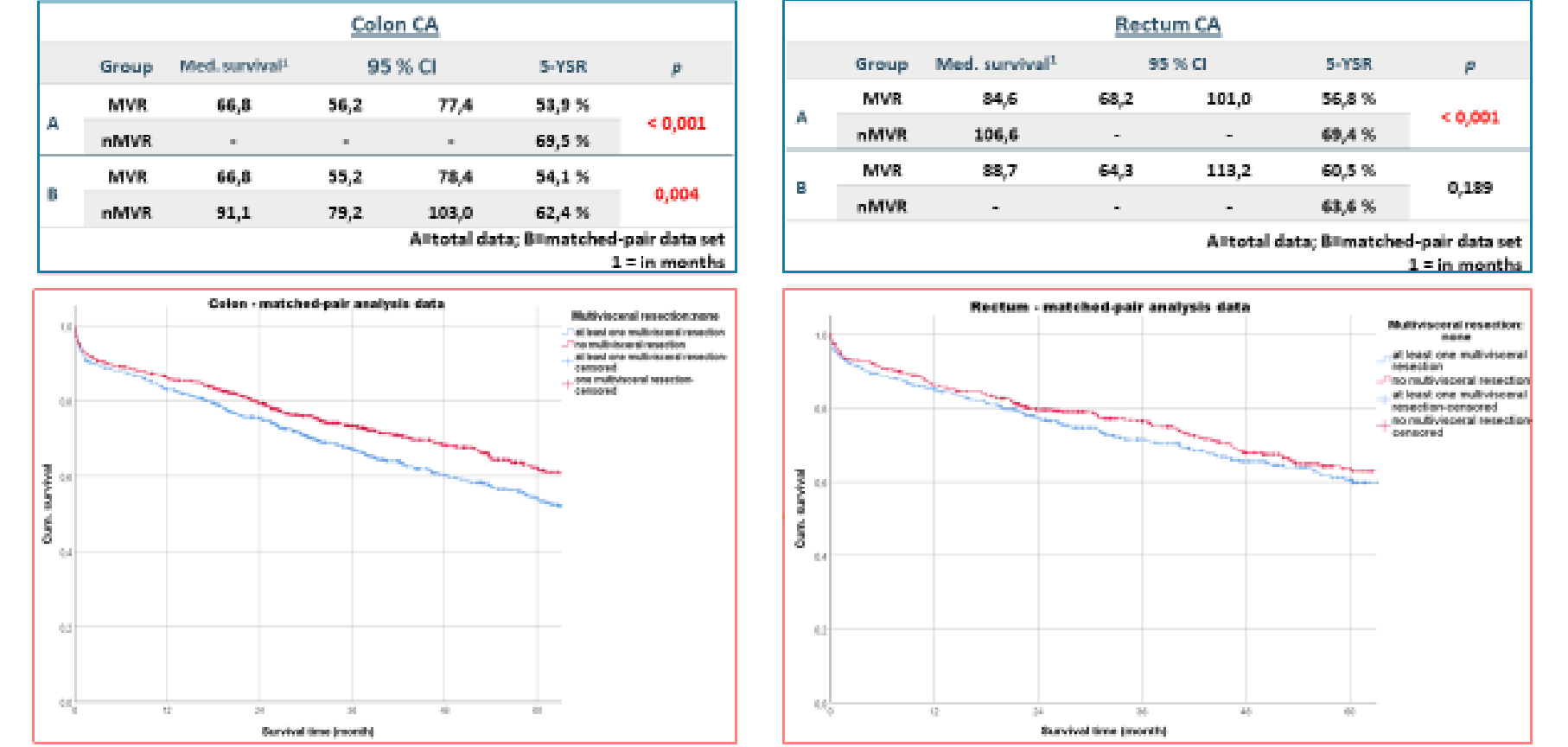
RESULTS - Morbidity



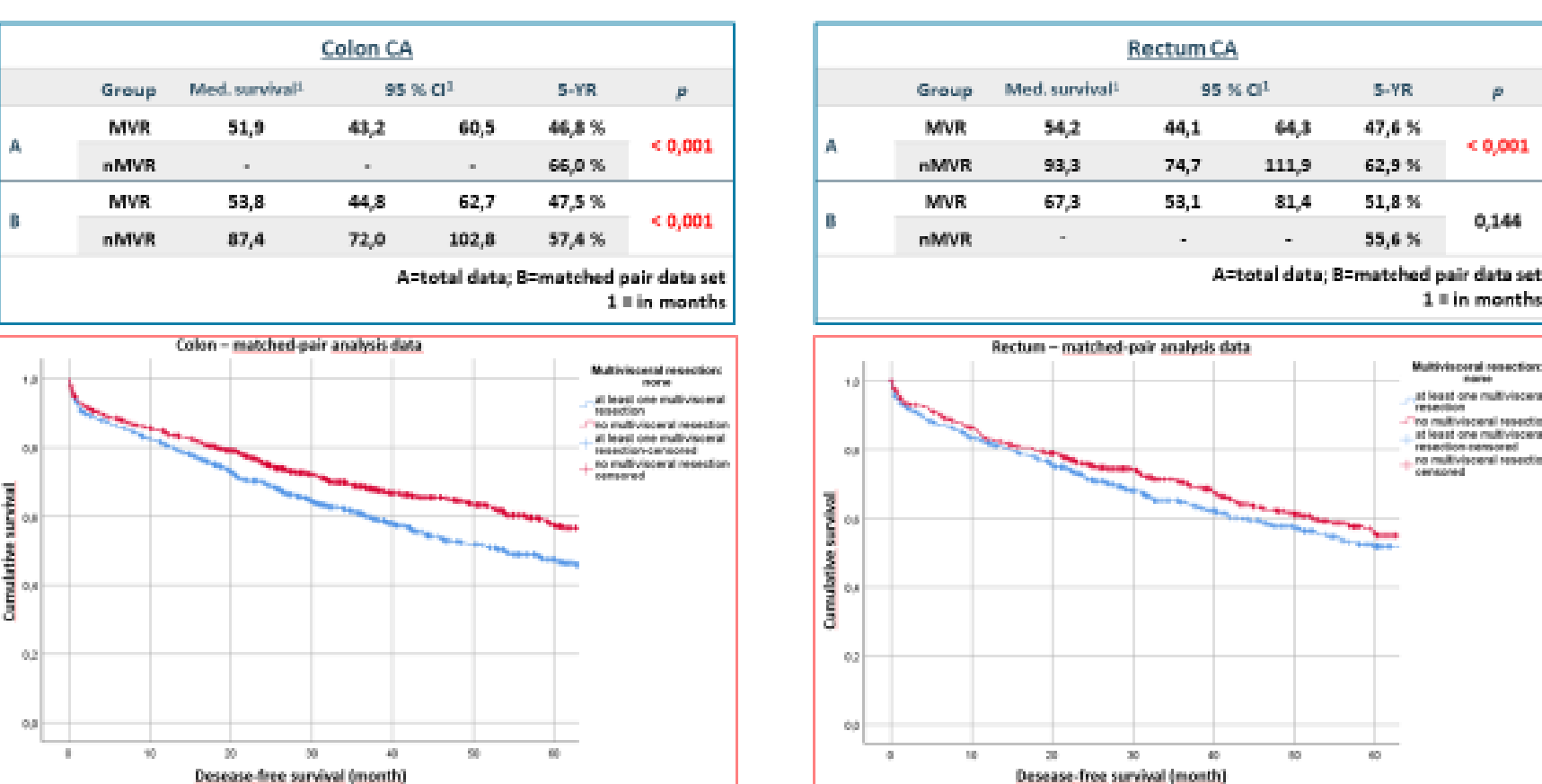
RESULTS - Hospital lethality



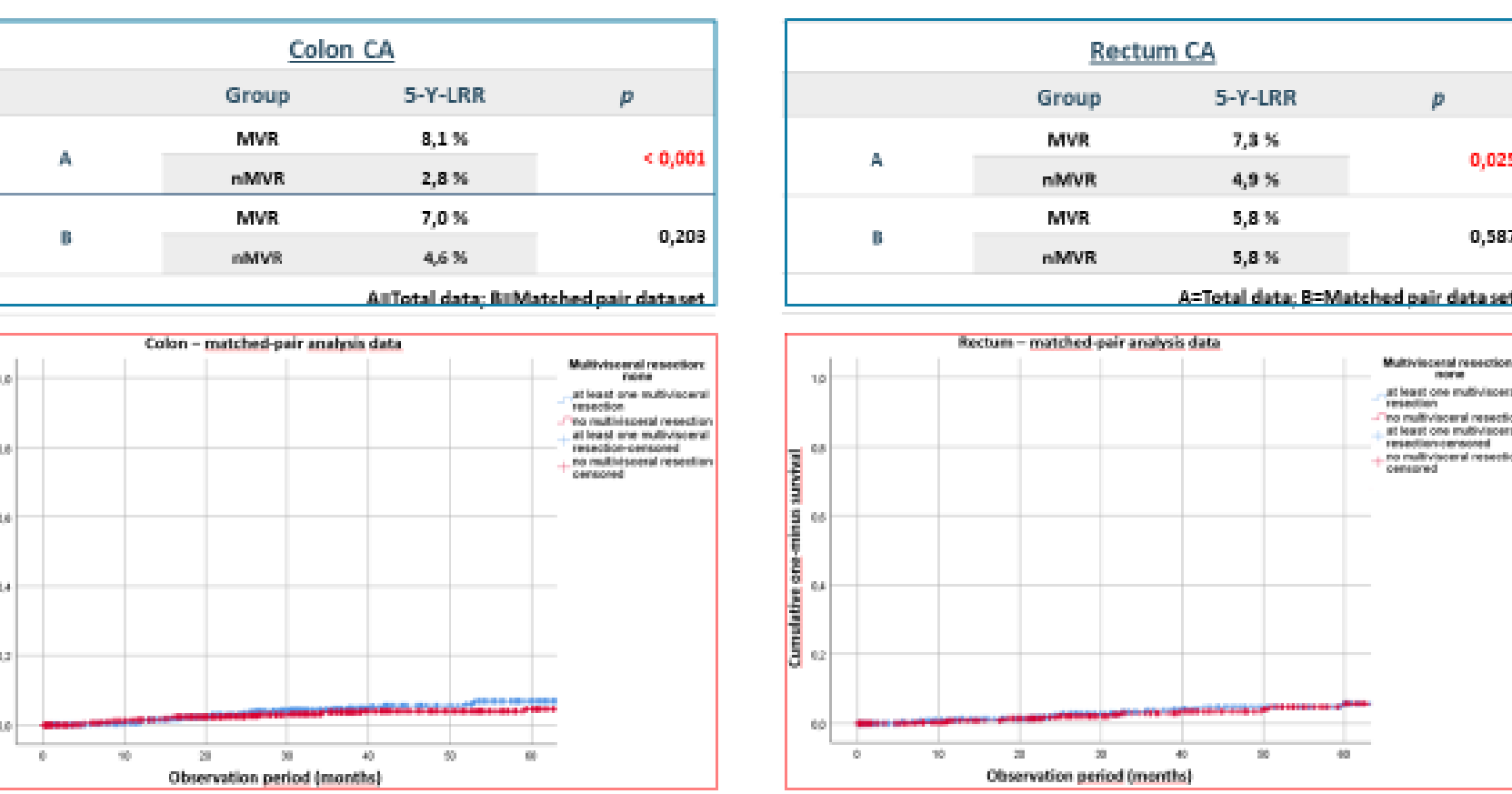
RESULTS - Overall survival



RESULTS - Disease-free survival



RESULTS - Local recurrence rate



RESULTS - Prognostic factors (matched-pair analysis)

Colon CA					
Factor type	Parameter	HR	Confidence Interval	p	
Morbidity	No vs. yes	2,17	1,69	2,78	< 0,001
pT	pT2 vs. pT4	3,40	1,11	9,30	0,008
pN	pN0 vs. pN1	1,82	1,33	2,50	< 0,001
Age group	< 50 vs. > 79	4,45	1,98	9,99	< 0,001
Risk factors	No vs. yes	1,79	1,13	2,42	0,013
Gender	Female vs. male	1,46	1,14	1,87	0,002
ASA	I vs. II-IV	2,24	1,17	4,30	0,015
adjuvant therapy	Yes vs. no	2,33	1,73	3,15	< 0,001

Rectum CA					
Factor type	Parameter	HR	Confidence Interval	p	
Morbidity	No vs. yes	1,80	1,38	2,34	< 0,001
Intraop. Complication	Yes vs. no	1,81	1,21	2,69	0,004
pT	pT1 vs. pT4	2,26	1,22	4,17	0,009
Age group	< 50 vs. > 79	4,14	1,84	10,40	0,003
Gender	Female vs. male	1,89	1,27	2,83	0,002
Gender	Female vs. male	1,34	1,03	1,75	0,026

Table 1 - Description of the patient population, Tu & node status, proportion of curative & palliative patients, as well as No. of resected organs; consideration of Tu & resection type

	Colon				Rectum					
	MVR	nMVR	TOTAL	p	MVR	nMVR	TOTAL	p		
Gender										
Men	720	46.4	7,605	54.1	8,325	53.4		< 0,001		
Women	831	53.6	6,448	45.9	7,279	46.6		< 0,001		
Age										
MW ± SD	71,2 ± 11,5	71,5 ± 10,8		0,001	68,8 ± 11,0	68,4 ± 11,0		0,725		
Invasion depth										
pT1	49	3,1	1,622	11,5	1,671	7,2	7,0	1,124	12,9	1,190
pT2	122	8,6	2,763	19,6	2,896	176	17,0	2,903	23,3	3,079
pT3	631	40,6	8,263	58,8	8,894	453	44,1	4,351	49,9	4,804
pT4	744	47,8	14,655	10,3	2,199	328	31,9	337	3,9	665
Lymph nodes										
pN0	949	61,0	9,363	66,4	10,312	637	62,0	5,803	66,6	6,440
pN1	385	22,8	3,100	22,0	3,455	241	23,4	1,884	21,6	2,125
pN2	252	16,2	1,640	11,6	1,892	150	14,6	1,029	11,8	1,179
Therapeutic intention										
Curative	1,442	93,1	13,872	98,8	16,314	930	90,5	8,511	97,9	9,441
Palliative	107	6,9	174	1,2	281	98	9,5	162	2,1	280
No. of organ resections										
1	1,176	76,6			654	63,7				
2	302	19,4			253	24,6				
3	78	5,0			120	11,7				

Table 2 - Complication, morbidity & lethality rates according to the tumor entry & resection type; additional indication of the results of the matched-pair analysis

	Colon				Rectum							
	MVR	nMVR	TOTAL	p	MVR	nMVR	TOTAL	p				
Complications												
Intraoperative	91	5,8	326	2,3	417	< 0,001	123	12,1	402	4,6	525	< 0,001
Postoperative												
General	425	27,3	2,568	18,2	2,993	< 0,001	260	25,5	1,397	16,2	1,657	< 0,001
Surgical	479	30,8	3,157	22,4	3,636	< 0,001	372	36,4	2,497	28,8	2,869	< 0,001
Morbidity												
TOTAL	43,7		32,3		< 0,001	47,2		36,3		< 0,001		
MPA	42,9		34,3		< 0,001	46,3		37,2		< 0,001		
Lethality												
TOTAL	7,5		4,9		< 0,001	3,9		3,8		< 0,001	2,6	
MPA	6,7		4,8		0,084	2,8		3,4		0,005	3,0	

Table 3 - Survival, disease-free survival & local recurrence rates according to the tumor entry & resection type with results of log-rank tests; results of the matched-pair analysis noted in parentheses (Med. survival: median survival time in month; 5-YSR: 5-year survival rate; DFS: disease-free survival; LRR: local recurrence rate)

	Colon				Rectum						
	Survival	Group	Med. survival	5-YSR	p	Med. survival	5-YSR	p			
TOTAL	MVR	66,8	(66,8)	63,9	(54,1)	< 0,001	64,6	(58,7)	66,8	(60,6)	< 0,001
	nMVR	-	-	69,5	(62,4)		106,6	(-)	69,4	(63,6)	(0,189)
pT status	MVR	81,2	(-)	65,6	(68,4)	0,057	88,7	(88,7)	78,2	(78,2)	0,378
	nMVR	-	(-)	77,6	(77,4)	(0,096)	-	(-)	76,8	(76,8)	(0,372)
pT2	MVR	-	(-)	63,5	(63,8)	0,296	-	(-)	59,4	(59,1)	0,361
	nMVR	-	(-)	67,6	(68,9)	(0,563)	93,3	(-)	62,4	(57,8)	(0,842)
pT3	MVR	48,2	(48,6)	42,1	(40,6)	0,074	43,2	(41,5)	38,1	(38,8)	0,798
	nMVR	-	(-)	46,7	(50,2)	(0,077)	42,0	(40,1)	44,3	(43,2)	(0,845)
pT4	MVR	62,4	(63,7)	46,7	(50,2)	0,077	42,0	(40,1)	44,3	(43,2)	(0,845)
	nMVR	-	(-)	46,7	(50,2)	(0,077)	42,0	(40,1)	44,3	(43,2)	(0,845)
R status	MVR	74,7	(74,7)	66,6	(55,4)	< 0,001	84,6	(88,7)	88,0	(82,2)	0,022
	nMVR	29,2	(21,3)	31,7	(29,1)	(0,001)	42,0	(41,4)	45,4	(33,3)	(0,005)
Disease-free survival	Group	Med. survival	5-YSR	p		Med. survival	5-YSR	p			
TOTAL	MVR	51,9	(51,8)	48,8	(47,5)	< 0,001	54,2	(57,3)	47,6	(51,8)	< 0,001
	nMVR	-	(-)	66,0	(57,4)	< 0,001	93,3	(-)	62,9	(55,8)	(0,144)
TOTAL	MVR	48,2	(48,6)	42,1	(40,6)	0,074	43,2	(41,5)	38,1	(38,8)	0,798
	nMVR	-	(-)	46,7	(50,2)	(0,077)	42,0	(40,1)	44,3	(43,2)	(0,845)
Local recurrence rate (LRR)	Group	Med. survival	5-YLR	p		Med. survival	5-YLR	p			
TOTAL	MVR	8,1	(7,0)	< 0,001		7,3	(5,8)	0,025			

CONCLUSION

- During surgical treatment of colorectal CA, peritumorous adhesion or infiltration of adjacent tissue or organs is observed in around one in 10 patients (colon CA, 9,9 %; rectum CA 10,6 %). Accordingly, multivisceral resection (MVR) must be performed in these cases. MVR of colon or rectum CA enable curation & an adequate long-term oncosurgical outcome through R0-resection.
- Compared to the conventionally resected group (nMVR), MVR tends to be associated with reduced five-year survival rates, reduced disease-free survival rates & increased local recurrence rates. However, the differences in survival are not significant, with the exception of pT4 colon CAs.
- MVR are associated with a significant increase in morbidity & hospital mortality.
- The present study underlines that MVR is not only justified but also must be demanded if indicated.