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Factors influencing hospital mortality and morbidity after colorectal resection in France. Three years National base (2009-2011) analysis

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Introduction

- Higher volume = better short outcome (mortality)
 - Oesophagectomy
 - Pancreatectomy
 - Hepatectomy
- Oncologic results after colorectal cancer resections
- Cochrane analysis published in 2012

Confirm volume-outcome relationship in colorectal cancer

- hospital
- surgeon

But differences between US and non-US data

Markar SR et al. J Gastrointest Surg 2012;16:1055-63.
van Heek NT et al. Ann Surg. 2005;242:781-8.
Farges O et al. Ann Surg 2012;256: 697–705.
Harmon JW et al. Ann Surg 230: 404-411.
Osler M et al. Ann Surg 253: 733-738.
Rabeneck L et al. Am J Gastroenterol 99: 668-675.
Archampong D et al. Cochrane Database Syst Rev 3: CD005391.



Introduction

- French medical system :
 - great variety of medical structures
- Colorectal surgery
 - Anglo-Saxon world
 - not in most other countries as in France
- Colorectal resections
 - homogeneous group of surgical procedures
 - a common threat : the anastomosis leak.



Aims

The aim of this study was to determine and analyze factors influencing mortality and morbidity after colorectal resection in France



Data Source

- PMSI database :
 - all discharge abstracts from hospitals in France
 - cover more than 99% of all cases since 2009.
 - Discharge abstracts include information :
 - patient's demographics,
 - principal and associated diagnosis codes
 - procedure codes
 - entry mode (home, emergency or hospital transfer)
 - discharge mode (home, transfer to another hospital, death)
 - length of stay
 - hospital identification code.
 - Diagnostic Related Group (DRG);
 - 4 levels of severity coded from 1 (basic) to 4 (most severe).



Patients

- From 2009 to 2012
 - Anonymous, alphanumeric patient identifier
 - identification of other hospital stays following the index admission
- Study Population
 - Patients undergoing colorectal resection
 - CCAM Code



Patients

- Variables
 - For hospital volume : ≤ 100 colorectal procedures vs. >100
 - For patient ages : ≤ 80 years vs. >80
 - Laparotomy vs. laparoscopy
 - DRG severity: level 1 or 2 vs. level 3 or 4
 - Surgical procedures were subdivided in :
 - demanding procedures (rectal resection, total colectomy, RPC)
 - less-demanding procedures.



Patients

- **Outcomes**

- In-hospital death : death in the index hospital.
- Post-operative complications
 - By diagnosis codes :
 - peritonitis, or fistulae
 - screening for :
 - specific surgical operation
 - radiologic drainage



Results

Patients 'characteristics	N (%)
Age \leq 80	149715 (84.9%)
Male	90718 (51.4%)
Hospital Volume \leq 100 cases per year	89423 (50.7%)
Diseases	
Cancer	99392 (56.3%)
Diverticulosis	35586 (20.2%)
IBD	3675 (2.1%)
Other	37790 (21.4%)
Surgery characteristics	
Laparotomy	115672 (65.6%)
Procedures	
Left Colectomy	56487 (32.0%)
Right colectomy	51488 (29.2%)
Rectal resections	44481 (25.2%)
Continuity reversal	11542 (6.5%)
Transverse colectomy	6218 (3.5%)
Total colectomy	4085 (2.3%)
Multiples colorectal resections	1384 0.8%)

Results

Overall morbidity 23.4% (n=41240)

Overall mortality was 3.1% (n=5408)

Surgical procedure	N	Morbidity	Mortality
Left Colectomy	56487	11202 (19.8%)	1159 (2%)
Right colectomy	51488	11146 (21.6%)	2354 (4.6%)
Rectal resections	44481	11500 (25.8%)	716 (1.6%)
Continuity reversal	11542	3054 (26.5%)	184 (1.6%)
Transverse colectomy	6218	2354 (37.9%)	613 (9.9%)
Total colectomy	4085	1237 (30.3%)	308 (7.5%)
Multiples colorectal resections	1384	495 (35.8%)	62 (4.5%)
RPC	758	252 (33.2%)	12 (1.6%)

Results

Characteristic	Univariate analysis			Multivariate analysis	
	Without Complication	With Complication	P values	OR (IC95%)	P value
	N (%)	N (%)			
Gender					
Men	68 052 (75.0)	22 666 (25.0)	<.0001	1.139 (1.112 - 1.167)	<.0001
Women	67 151 (78.3)	18 574 (21.7)			
Patient ages					
<= 80 years	114 854 (76.7)	34 862 (23.3)	0.04	2.017(1.951 - 2.085)	<.0001
> 80 years	20 350 (76.1)	6 378 (23.9)			
Reason for resection					
Other than Diverticulosis	105 800 (75.1)	35 058 (24.9)	<.0001		NS
Diverticulosis	29 404 (82.6)	6 182 (17.4)			
Procedure					
Laparotomy	85 205 (73.7)	30 467 (26.4)	<.0001	1.274(1.238 - 1.310)	<.0001
Laparoscopy	49 998 (82.3)	10 773 (17.7)			
DRG severity					
Level 3-4	44 868 (59.0)	31 142 (41.0)	<.0001	6.867(6.687 - 7.052)	<.0001
Level 1-2	90 335 (89.9)	10 098 (10.1)			
Hospital volume					
<= 100	68 971 (77.1)	20 452 (22.9)	<.0001	1.065(1.040 – 1.091)	<.0001
> 100	66 232 (76.1)	20 788 (23.9)			
Demanding procedure					
Yes	37 224 (73.4)	13 484 (26.6)	<.0001	1.253(1.220 - 1.287)	<.0001
No	97 979 (77.9)	27 756 (22.1)			

Panis Y et al. Ann Surg 254: 738-743.

Nelson H et al. N Engl J Med 2004; 350: 2050-2059.

Results

Characteristic	Univariate analysis			Multivariate analysis	
	Alive	In-Hospital Death	P values	OR IC95%	P value
	Number (%)	Number (%)			
Sex			<.0001		
Men	87 767 (96.7)	2951 (3.3)		1,288(1.218 - 1.363)	<.0001
Women	83 268 (97.1)	2457 (2.9)			
Patient ages			0.04		
<= 80 years	14 6841 (98.1)	2874 (1.9)			
> 80 years	24 194 (90.5)	2534 (9.5)		2,727 (2.572 - 2.892)	<.0001
Reason for resection			<.0001		
Other than Diverticulosis	135 680 (96.3)	5177 (3.7)		2,339 (2.039 - 2.682)	<.0001
Diverticulosis	35 355 (99.3)	231 (0.7)			
Procedure			<.0001		
Laparotomy	110 808 (95.8)	4864 (4.2)		2,252 (2.047 - 2.477)	<.0001
Laparoscopy	60 227 (99.1)	544 (0.9)			
DRG severity			<.0001		
Level 3-4	71 324 (93.8)	4 686 (6.2)		5,604 (5.163 - 6.083)	<.0001
Level 1-2	99 711 (99.3)	722 (0.7)			
Hospital volume			<.0001		
<= 100	86 381 (96.6)	3 042 (3.4)		1,126 (1.064 - 1.191)	<.0001
> 100	84 654 (97.3)	2 366 (2.7)			
Demanding procedure			<.0001		
Yes	49 610 (97.3)	1 098 (2.2)			
No	121 425 (96.6)	4 310 (3.4)		1.240 (1.156 - 1.331)	<.0001

Van Arendonk KJ et al. JAMA Surg 148: 316-321.

Janes S et al. Br J Surg 92: 133-142.

Results

Center's administrative status	Patients operated	In-Hospital Death	N of alive patient transfered	Mortality after transfer	Overall mortality	% increase mortality with transfer
	n (%)	n (%)	n (%)	n (%)	n (%)	
<i>Private hospital</i>	85115	1673 (2.0%)	3044 (3.6%)	403 (13.2%)	2076 (2.4%)	19.4%
<i>Public-sector medical center</i>	47377	2411 (5.1%)	1444 (3.0%)	158 (10.9%)	2569 (5.4%)	6.2%
<i>Public-sector university medical center</i>	27989	978 (3.5%)	796 (2.8%)	67 (8.4%)	1045 (3.7%)	6.4%
<i>Charity hospital</i>	14694	291 (2.0%)	667 (4.5%)	46 (6.9%)	337 (2.3%)	13.6%
<i>Army hospital</i>	1269	55 (4.3%)	87 (6.9%)	13 (14.9%)	68 (5.4%)	19.1%
Total	176444	5408 (3.1%)	6038 (3.4%)	687 (11.4%)	6095 (3.5%)	11.3%
Structure with < 100 patients operated each year						
<i>Private hospital</i>	44 736	886 (2.0%)	2104 (4.7%)	267 (12.7%)	1153 (2.6%)	23.2%
<i>Public-sector medical center</i>	36 618	1888 (5.2%)	1275 (3.5%)	147 (11.5%)	2035 (5.6%)	7.2%
<i>Public-sector university medical center</i>	1 625	94 (5.8%)	100 (6.2%)	13 (13.0%)	107 (6.6%)	12.1%
<i>Charity hospital</i>	5 176	119 (2.3%)	314 (6.1%)	24 (7.6%)	143 (2.8%)	16.8%
<i>Army hospital</i>	1 269	55 (4.3%)	87 (6.9%)	13 (14.9%)	68 (5.4%)	19.1%
Total	89424	3042 (3.4%)	3380 (4.3%)	464 (12.0%)	3506 (3.9%)	13.2%
Structure with > 100 patients operated each year						
<i>Private hospital</i>	40 379	787 (1.9%)	940 (2.3%)	136 (14.5%)	923 (2.3%)	14.7%
<i>Public-sector medical center</i>	10 759	523 (4.9%)	169(1.6%)	11 (6.5%)	534 (5.0%)	2.1%
<i>Public-sector university medical center</i>	26 364	884 (3.4%)	696 (2.6%)	54 (7.8%)	938 (3.6%)	5.8%
<i>Charity hospital</i>	9 518	172 (1.8%)	353 (3.7%)	22 (6.2%)	194 (2.0%)	11.3%
Total	87020	2366 (2.7%)	2158 (2.5%)	223 (10.3%)	2589 (3.0%)	8.6%

Conclusion

Specific attention to national recommendation in regards of the real observed mortality rate after colorectal resection.

Colorectal resection should be performed in centre performing more than s a variable that 100 resections per year.





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