
GISCoR22

E' possibile definire degli indicatori di qualità per la resezione endoscopica dei polipi del colon?

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Ospedale Valduce
Como

ai sensi dell'art. 3.3 sul Conflitto di Interessi, pag. 17 del Reg. Applicativo dell'Accordo Stato-Regione del 5 novembre 2009,

dichiaro

che negli ultimi due anni ha avuto rapporti diretti di finanziamento con i seguenti soggetti portatori di interessi commerciali in campo sanitario:

- *Fujifilm*

Endoscopic detection and resection of precancerous polyps reduces incidence and mortality of CRC

Quality improvements:

- Detection

- Resection

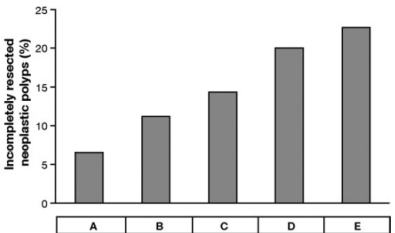
Coerly et al. NEJM 2014;370:1298-306

Incomplete Polyp Resection During Colonoscopy—Results of the Complete Adenoma Resection (CARE) Study

Prospective study - 1427 pts colonoscopy
Biopsies of resection margin after macroscopic complete polyp removal

10% incompletely resected

RRA increased with:
- polyp size: 10–20 mm vs 5–9 mm - 17.3% vs 6.8%; relative risk 2.1
- sessile serrated polyps - 31.0% vs 7.2%; relative risk 3.7



Endoscopist	A	B	C	D	E
Polyps resected, n = 418	241 (57.7%)	28 (6.7%)	29 (6.9%)	24 (5.7%)	26 (6.2%)
Neoplastic polyps resected, n = 346	201 (58.1%)	18 (5.2%)	28 (8.1%)	20 (5.8%)	22 (6.4%)
Incompletely resected neoplastic polyps, n = 35	13 (6.5%)	2 (11.1%)	4 (14.3%)	4 (20.0%)	5 (22.7%)
Univariate analysis, RR (95% CI)	1.00 (referent)	1.72 (0.42-7.05)	2.21 (0.77-6.32)	3.09 (1.11-8.61)	3.51 (1.38-8.95)
Multivariate analysis, RR (95% CI)	1.00 (referent)	1.98 (0.51-7.75)	2.87 (1.02-8.03)	2.04 (0.71-5.93)	3.45 (1.35-8.81)

CONCLUSIONS:
Neoplastic polyps are often incompletely resected with high variability among endoscopists

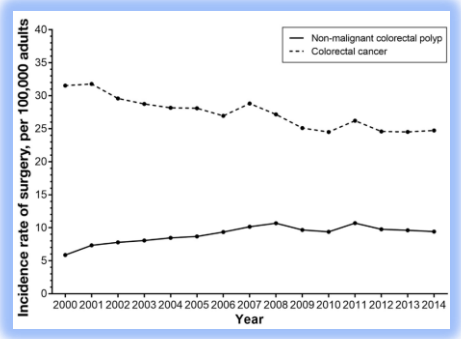
Pohl et al. Gastroenterology 2013;144:74-80.e.1 (CARE study)

Consequences of an incomplete resection

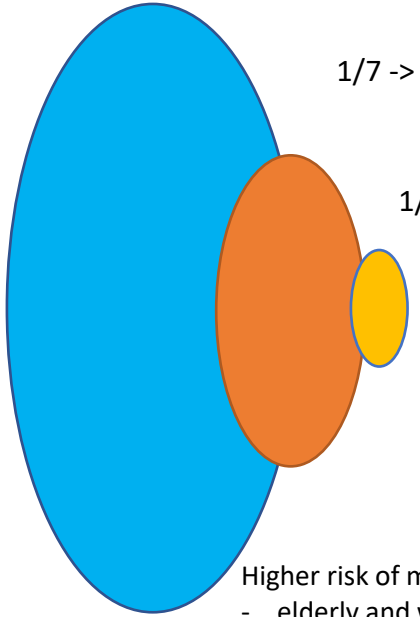
Referral to surgery

Increasing Rates of Surgery for Patients With Nonmalignant Colorectal Polyps in the United States

1.230.458 surgeries for polyps and CRC
25% for nonmalignant polyps



Patients undergoing surgery



1/7 -> major morbidity

1/50 -> colostomy

1/150 -> death

Higher risk of morbidity and mortality
- elderly and with comorbidities
- rectal polyp (4%)

Peery et al. Gastroenterology 2018;154:1352–1360

Consequences of an incomplete resection

Interval cancer

Colorectal cancers soon after colonoscopy: a pooled multicohort analysis

8 large (9167 patients) North American studies
Follow-up (median 47,2 months) pts baseline colonoscopy: + adenoma

World Endoscopy Organization Consensus Statements on Post-Colonoscopy and Post-Imaging Colorectal Cancer

Terminology and Definitions

Statement 1. We recommend that *post-colonoscopy colorectal cancer* (PCCRC) be the preferred term for cancers appearing after a colonoscopy in which no cancer is diagnosed. *GRADE of evidence: very low; strength of recommendation: strong.*

Statement 2. PCCRCs can be sub-categorized into:

- **Interval cancers (where the cancer is identified before the next recommended screening or surveillance examination)**
- **Non-interval cancers (where the cancer is identified at [type A] or after [type B] a recommended screening or surveillance interval, or where no subsequent screening or surveillance interval for repeat examination was recommended [type C], up to 10 years after the colonoscopy)**

GRADE of evidence: very low; strength of recommendation: strong.

Algorithm based on time from previous colonoscopy and presence, size and histology of adenomas
-> interval cancers as new, missed, incompletely resected or due to failed biopsy detection

Invasive cancer: 0.6%
- 52% probable missed lesions
- 19% related to incomplete resection
- 24% probable new lesion
- 5% failed biopsy detection

Robertson et al. Gut. 2014 June ; 63(6): 949–956

Rutter et al. Gastro 2018;155:909–925

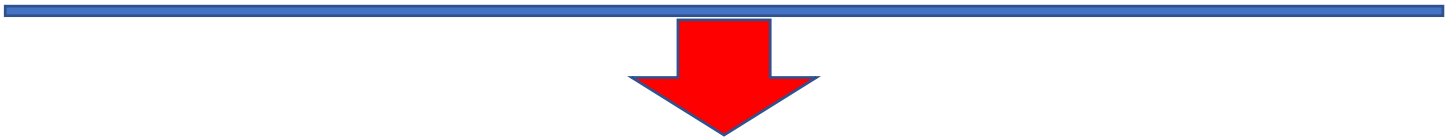
Why an incomplete resection

Very different shapes, sizes and sites of polyps

▶ **Table 1** The SMSA scores and levels.

Size	Points	Morphology	Points	Site	Points	Access	Points
<1 cm	1	Pedunculated	1	Left colon	1	Easy	1
1–1.9 cm	3	Sessile	2	Right colon	2	Difficult	2
2–2.9 cm	5	Flat	3				
3–3.9 cm	7						
>4 cm	9						

SMSA, size, morphology, site, access; SMSA level: SMSA 1 = 4–5 points; SMSA 2 = 6–9 points; SMSA 3 = 10–12 points; SMSA 4 = >12 points



Methodologic approach tailored to the specific characteristics of the polyps

Sidhu et al. Endoscopy 2018; 50: 684–692

Advanced lesions

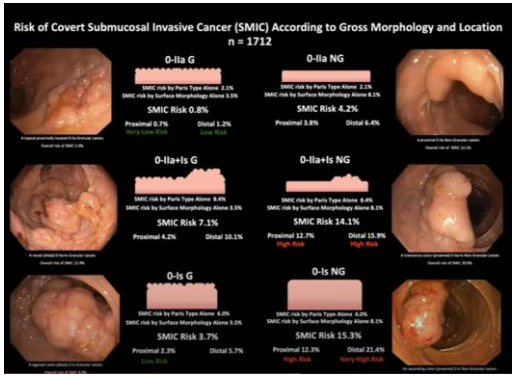
flat lesions larger than 25 mm

pedunculated polyps of greater than 20 mm in size or with a stalk greater than 1 cm

lesions greater than 10–20 mm in size in difficult locations such as the ileocaecal valve, appendiceal orifice, or dentate line

Higher risk of progression to cancer

Risk of covert submucosal invasive cancer (10%)



Endoscopic resection:

- challenging
- higher risk of AEs and recurrence

Burgess et al. Gastroenterology 2017;153:732-742

D'Amico et al. CGH 2021;19:1395-1401

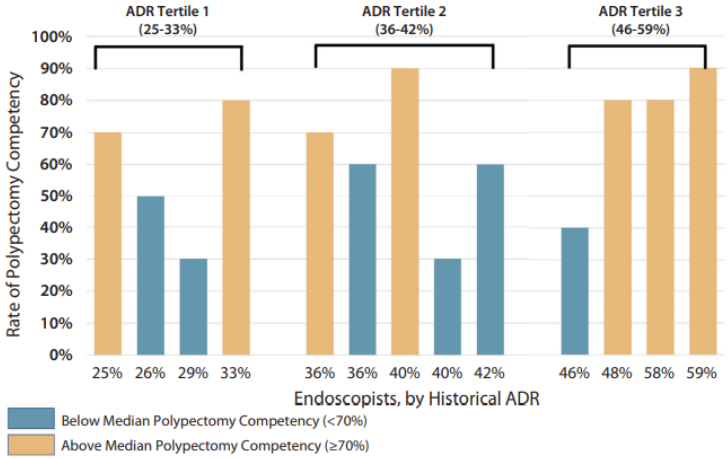
Variation in competency

Assessing colon polypectomy competency and its association with established quality metrics

Prospective observational study
13 high-volume screening colonoscopists at academic medical centers (Chicago – San Francisco)

Rate of competent polyp removal 30-90%
- diminutive 70%
- small or large 50%

Individual skills:
- Achieving optimal position
- Polyp view
- Determining the full extent
- Obtaining stable position
- Examining after-polypectomy site
- Treating residual polyp



No correlation with colonoscopist historical ADRs

Duloy et al. GIE 2018;87:635644

No performance indicators for endoscopic resection

Quality indicator

Ratio between the incidence of correct performance and the opportunity for correct performance or as the proportion of interventions that achieve a predefined goal

3 categories:

1. structural measures: assess characteristics of the entire health care environment (eg, participation by a physician or other clinician in systematic clinical database registry that includes consensus endorsed quality measures)
2. process measures: assess performance during the delivery of care (eg, ADR, APC)
3. outcome measures: assess the results of the care that was provided (eg, the prevention of cancer by colonoscopy and reduction in the incidence of colonoscopic perforation)

Actionable
Timely
Comparable
Accessible

Quality Indicators for the Detection and Removal of Colorectal Polyps and Interventions to Improve Them

Polypectomy quality metrics

Outcome metrics

- Complete resection rate
- Post-colonoscopy colorectal cancer rate

Process metrics

- Adherence to polypectomy guidelines

Polypectomy skills assessment tools

- Direct observation of polypectomy skills (DOPyS) tool
- Cold snare polypectomy assessment tool (CSPAT)
- Assessment of competency in endoscopy tool for colonoscopy (ACE)

Polypectomy interventions

Endoscopy unit: guidelines adherence to optimize technique

- Cold snare polypectomy for non-pedunculated polyps <1cm
- Snare polypectomy for non-pedunculated lesions 10-19mm
- Hot snare polypectomy for pedunculated lesions ≥10mm
- Referral for endoscopic resection of benign complex polyps

Effective skills training: fellows and independent providers

- Feedback using structured polypectomy skills assessment tools (e.g., DOPyS, CSPAT, ACE)
- Video-based training

Individual colonoscopist: additional resources

- Simulation training
- Educational videos
- Hands-on courses

Lam et al. Gastroint Endoscopy Clin N Am 2022;32:329-349

What are the potential quality indicators of polypectomy/EMR?

appropriate technique selection relative to lesion subtype	Guideline, Size measurementMorphology description Advanced imaging assesment
safety metrics (eg, avoidance of deep mural injury and post-procedural bleeding)	bleeding perforation
complete resection of the target tissue	Virtual chromendoscopy of resection margin,
negligible recurrence rates	measurement of recurrence rates
rate of enbloc resections<20mm colon,<25mm in rectum	R0 histology
efficiency (ie, avoiding unnecessary expense, time expenditure, or opportunity cost).	Basis polypectomy ? Advanced polypectomy?
Polyp retrieval rate	For cold/hot snare
Tattooing resection sites	Difficult to find locations
Rate of benign polyps referred to surgery	Operation reports

Main outcomes:

1. Effectiveness:
   - technical and clinical success
   - recurrence
   - surveillance colonoscopy
   - referral to surgery

2. Safety
   - adverse events

Area of improvement:

1. Effectiveness:
   - technical and clinical success
   - recurrence
   - surveillance colonoscopy
   - referral to surgery

2. Safety
   - adverse events

Technical and clinical success

Polypectomy? Cold snare revolution

recommended for diminutive and small polyps:

- safety profile
- complete resection rate
- easy and quick

EMR?

Recurrence - Outcome measure

Type of resection:

- *piecemeal* RRA up to 40%
- *en bloc* 2-3%

- Size (> 40 mm)
- intra-procedural bleeding
- HGD

- Ileo-cecal valve
- no *lifting* sign
- failed previous attempt of resection

2015	2017	2019	2021
15-30%	13.8%	5.2%	1.4%

Over time change – appropriate technique selection

≤ 20-25mm, no SMIC	→	*en bloc*-EMR
>20-25mm, or *en bloc* not feasible	→	*piecemeal*-EMR
large or suspected SMIC	→	*Advanced resection*

- include a few millimeters of macroscopically healthy mucosal margin in the resection
- add dye (carmine indigo or methylene blue) to delineate the lesion margins

Over time change – additional techniques

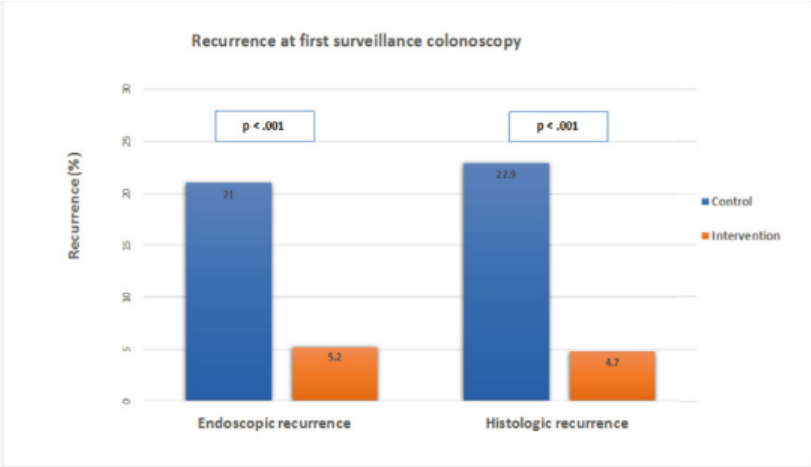
Thermal Ablation of Mucosal Defect Margins

RCT
390 patients with LNPCPs
4 tertiary centers in Australia

210 thermal ablation of margin vs 206 control
STSC; ERBE VIO SOFT COAG: 80W, Effect 4; ERBE,

Recurrence (SC1):
5.2% vs 21.0% (P < .001)

AEs similar between the groups



→ four-fold reduction in adenoma recurrence

Over time change – additional techniques

Outcomes of Thermal Ablation of the Mucosal Defect Margin After Endoscopic Mucosal Resection: A Prospective, International, Multicenter Trial of 1000 Large Nonpedunculated Colorectal Polyps

1049 LNPCPs in 1049 patients

Uniform completeness of EMR-T 95.4%

RRA (SC1)
Complete EMR-T: 1.4%
Incomplete EMR-T: 23.4%

→ EMR-T should be universally used

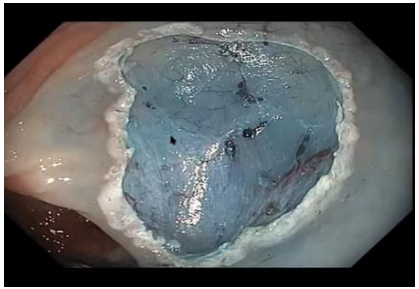


Table 2. Procedural Outcomes of LNPCPs With Complete EMR-T After Technically Successful Single Session Index EMR

Total	n = 1037
Duration (*min*), median (IQR)	30 (18–50)
IPB, n (%)	62 (6.0)
DMI[a] (III–V), n (%)	27 (2.5)
CSPEB, n (%)	71 (6.8)
Delayed perforation, n (%)	1 (0.1)
Surgery after index procedure, n (%)	34 (3.3)
Complete EMR-T, n (%)	989 (95.4)
SC1[b]	n = 669/707
Months, median (IQR)	5.9 (4.9–6.9)
Recurrence at SC1, n (%)	9/669 (1.3)
Surgery after SC1, n (%)	4 (0.6)

[a]Sydney DMI classification (17).
[b]SC1 of those LNPCPs that underwent complete EMR-T.
Clinically significant post-EMR bleeding:CSPEB

Recurrence?

Efficacy and safety of endoscopic resection of large colorectal polyps: a systematic review and meta-analysis

Original Article

Intra-procedural and delayed bleeding after resection of large colorectal lesions: The SCALP study

Evaluation of polypectomy quality indicators of large nonpedunculated colorectal polyps in a nonexpert, bowel cancer screening cohort

	N°	Technical success	Clinical success	Recurrence	AEs	Bleeding	Perforation	Surgical referral	Surgery for non-curative resection	Surgery for AEs	Compliance with surveillance
Hassan 2016	6442			**13.8%**		6.5%	1.5%		8%	1%	91.4%
Amato 2019	1648	91%		**19%**		8.5% intra 2% late	1.0%		4%	0.13% DMI	
Meulen 2021	11130	74-93%	81-96%	**9-26%**	5%	4%	1%	7%			74% n/enbloc 40% enbloc

Hassan et al Gut 2016;65: 806-20

Amato et al UEGJ 2019;7:1361-1372

Meulen et al GIE; 2021:94:1085-1095e2

AEs: bleeding?

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Surgery for non-curative resection?

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Compliance with surveillance?

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Meulen 2021	11130	74-93%	81-96%	9-26%	5%	4%	1%	7%			**74% n/enbloc 40% enbloc**

Unclear generalizability of data from referral center

Endoscopic resection

Static process

Risks

Dynamic process

Costs
Patient and structural burden

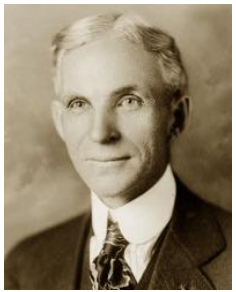
What are the potential quality indicators of polypectomy/EMR?

	Benchmark
appropriate technique selection relative to lesion subtype	**90-95%**
safety metrics (eg, avoidance of deep mural injury and post-procedural bleeding)	-
complete resection of the target tissue	-
negligible recurrence rates	?
rate of enbloc resections<20mm colon,<25mm in rectum	**90-95%**
efficiency (ie, avoiding unnecessary expense, time expenditure, or opportunity cost).	-
Polyp retrieval rate	**Diminutive/small: 90-95%**
Tattooing resection sites	**Advanced: 100%**
Rate of benign polyps referred to surgery	?

CONCLUSIONS

- YES, it is possible to start defining some quality indicator
- Benchmark issue:
  . variation in competency -> training, retraining and assessment

"Quality means doing it right when no one is looking"



Henry Ford

(July 30, 1863 – April 7, 1947)

GRAZIE VALDUCE!

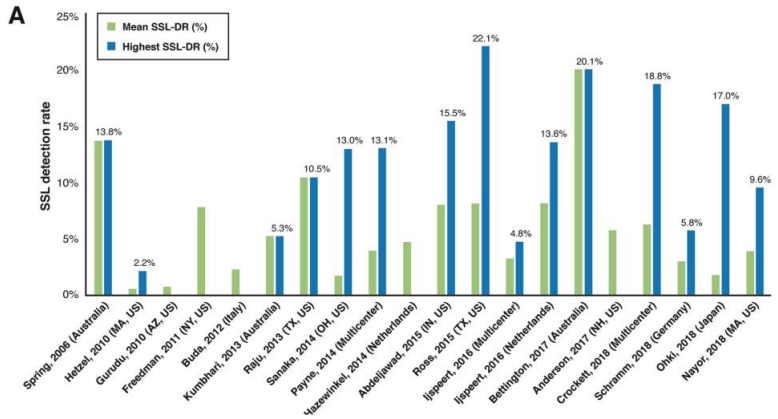
Sessile serrated polyps

Vs HP:
- larger
- frequently BRAF mutations
- PRKACB (metabolic genomic marker) association
- mucin proteins production
- lower HDL, higher triglyceride
- obesity and smoking

Syndrome:
at least 5 serrated lesions or polyps proximal to the rectum, all 5 mm, with 2 or more that are 10 mm, or more than 20 serrated lesions or polyps of any size distributed throughout the large bowel, with at least 5 proximal to the rectum

substantial variation in detection

2-8%
High-performers: 13%–20%
Dysplastic SSLs: 4%–8%
50%: synchronous



Tang et al. Am J Cancer Research 2022 May 15;12(5):1982-1994

Kim et al. ANZ J Surg 2020; 90:2484–2489