



Strategies for Colonic Flexures Cancer

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Six Steps From Embryology to Operating Room Strategy

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Burden of Disease

Epidemiology & why flexures deserve dedicated strategy

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MIS, ICG mapping, and a working operative algorithm

Flexure Cancers Are Uncommon but Clinically Distinct

~10% of all colonic cancers arise at a flexure (hepatic + splenic)

2–8% reported incidence of splenic flexure cancer alone



curative (R0) resection rate at presentation vs. other sites

Why the Distinction Matters

- **Later presentation** — often larger tumors, higher T-stage, and higher obstruction rates at diagnosis
- **Dual, variable blood supply** spanning embryological midgut–hindgut junction (watershed vulnerability)
- **Extent of lymphadenectomy remains debated** — no single universally agreed operation
- **Stage-matched outcomes are comparable to other sites** once R0 resection is achieved — making surgical strategy the decisive variable

Why Flexure Tumors Are a Distinct Surgical Problem

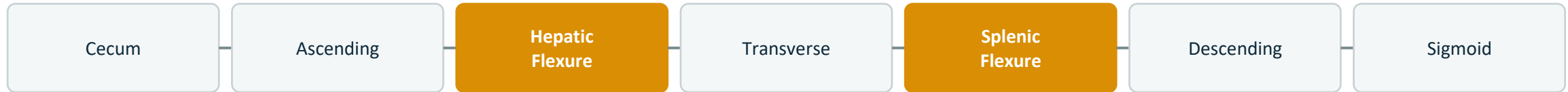
- 1 Vascular Variability** Rght colic absent in ~20%; middle colic branching unpredictable
- 2 Watershed Perfusion** Splenic flexure anastomoses depend on collateral flow that can fail after aggressive central ligation
- 3 Ambiguous Lymphatic Drainage** Tumors can drain toward two arterial territories — no consensus on which nodal basins must be cleared
- 4 No Universal Operation** Segmental colectomy, standard hemicolectomy, and extended hemicolectomy each have defensible series — evidence is heterogeneous

SECTION I

Anatomic Foundations

Embryology, watershed vascular zones, and why the flexures are a different surgical problem

Two Different Embryologic Junctions, Two Different Problems

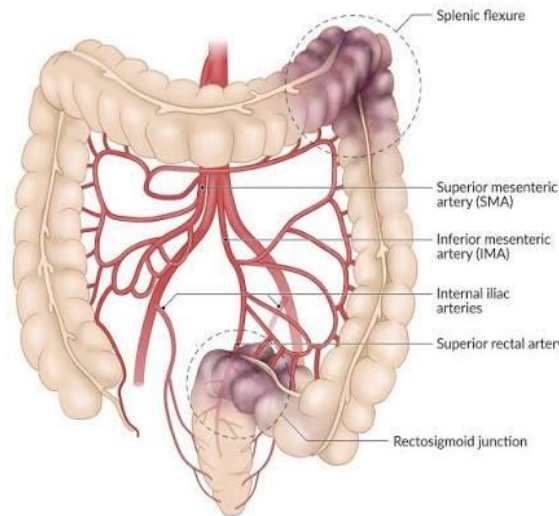


MIDGUT · Superior Mesenteric Artery Territory

HINDGUT · Inferior Mesenteric Artery Territory

Splenic Flexure A— True WatAershed

- Exact embryological **midgut–hindgut junction**
- Supplied by the terminal **marginal artery (Drummond) ± arc of Riolan**
- More Anastomotic **ischemia risk**



Griffith's Point

Hepatic Flexure — Arcade Junction

- Lies within midgut territory, at the **ileocolic/right-colic ↔ middle-colic arcade junction**
- **Right colic artery absent in up to ~20% — variable arcade completeness**
- **Lymphatic drainage can cross toward gastrocolic/infrapyloric nodes**

SECTION II

Diagnosis & Staging

Localization pitfalls, staging workflow, and the stage-specific survival penalty

Localization Is the First Strategic Decision

1

Endoscopic Mapping

- Submucosal tattoo placed distal to the lesion at index colonoscopy
- Photograph flexure angulation — endoscopic “location” is wrong in up to 1 in 6 cases

2

Cross-Sectional Imaging

- Contrast-enhanced CT chest/abdomen/pelvis for staging and vascular road-mapping
- CT colonography or barium enema when colonoscopy is incomplete (obstructing lesion)

3

Functional / Metabolic

- MRI liver for equivocal hepatic lesions
- PET-CT selectively for equivocal metastatic disease, not routine staging

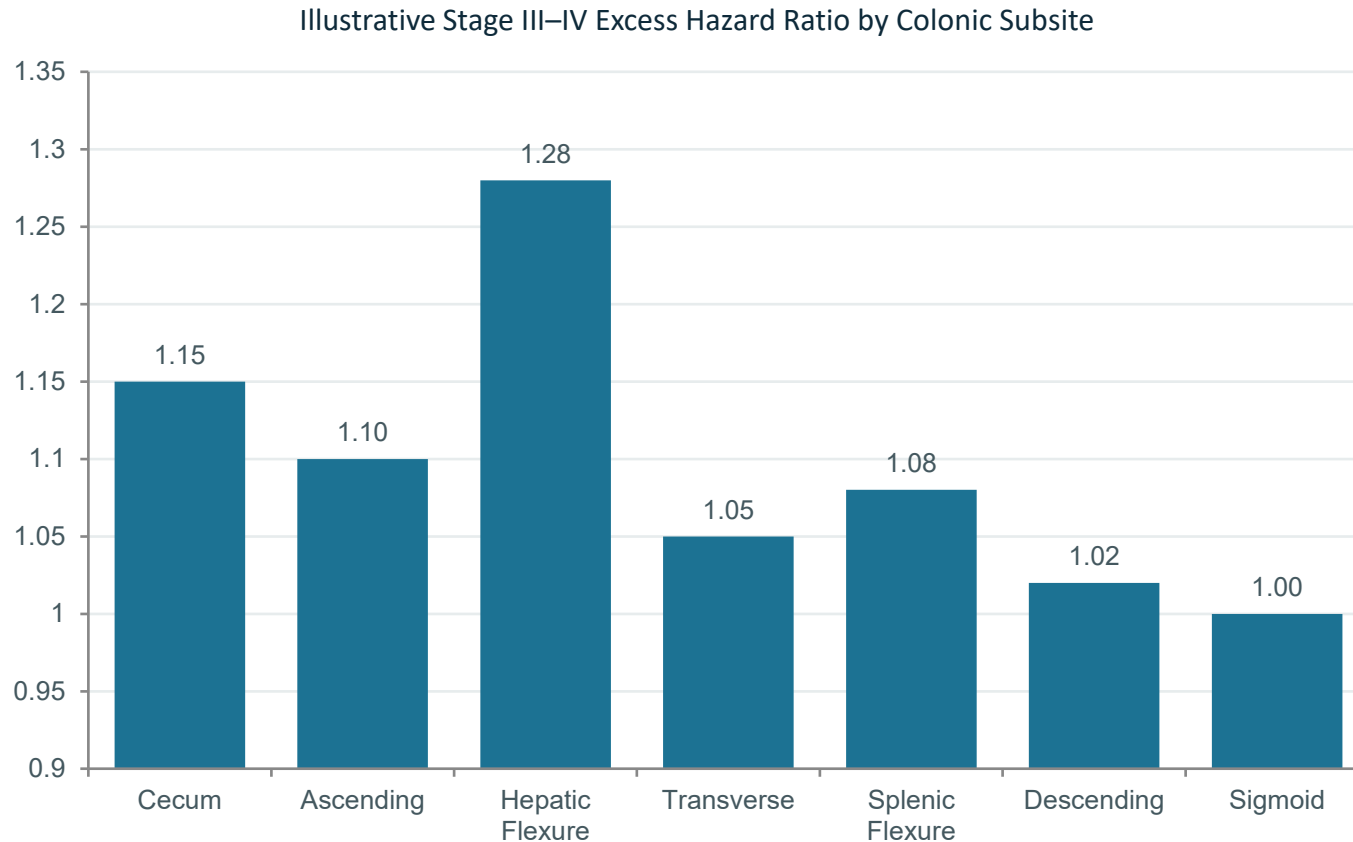
Key pearl: because up to ~17% of endoscopically localized lesions shift segment at surgery, tattoo placement and multidisciplinary correlation of scope + CT findings should precede any commitment to extent of resection.

Hepatic Flexure Carries an Independent Stage III–IV Survival Penalty

Reading the Evidence

Poorer survival for hepatic flexure cancer in stage III, IV:

- Distinct tumor biology
- More aggressive metastatic pattern
- Comparatively lower chemosensitivity



SECTION III

Hepatic Flexure Strategy

Extent of resection and lymphadenectomy — what the mapping data actually support

Extended Right Hemicolectomy: Matching Extent to Risk

Extended Right Hemicolectomy

HEPATIC FLEXURE / PROXIMAL TRANSVERSE

- Additional ligation of the **middle colic artery at its origin**
- Consider **infrapyloric node dissection (16% Involved)** in high-risk tumors (T3–T4, poorly differentiated, bulky/obstructing)
- Anticipate **gastrocolic ligament nodal involvement (10% involved)** in a meaningful minority

Operative Technique Sequence

- | | | |
|---|--|--|
| 1 | Medial-to-Lateral Mobilization | Identify ileocolic pedicle, enter the retroperitoneal (Toldt) plane, expose duodenum and preserve Gerota's fascia |
| 2 | Central Vascular Ligation | Skeletonize ileocolic, right colic (if present), and middle colic vessels at their origin; ligate per planned extent |
| 3 | Gastrocolic / Infrapyloric Step | Enter lesser sac, separate omentum from transverse colon; dissect infrapyloric nodes only if indicated |
| 4 | Full Flexure & Duodenal Release | Complete hepatic flexure takedown off the duodenum and hepatic capsule under direct vision |
| 5 | Specimen Extraction & Anastomosis | Ensure tension-free, well-perfused ileocolic or colo-colic anastomosis; confirm margins and node retrieval ≥ 12 |

SECTION IV

Splenic Flexure Strategy

Segmental resection, hemicolectomy, and CME with central vascular ligation — what the outcome data show

04 · SPLENIC FLEXURE STRATEGY

Three Operations — Choosing Among Them

Segmental (Flexure) Colectomy

Resect the flexure with both pedicles individually ligated; preserves more bowel length

Vascular anatomy favorable

Left Hemicolectomy

Standard IMA-based resection extended proximally to include the flexure

Most widely practiced

Extended Left Hemicolectomy

Combines middle colic and IMA ligation for bulky or proximally-extending tumors

Bulky / borderline tumors

Comparison between three procedures shows:

- Short-term morbidity, mortality, and lymph node yield were statistically comparable across all three approaches
- Long-term overall and disease-free survival did not differ significantly
- Choice can therefore be individualized to vascular anatomy, tumor bulk, and surgeon experience

04 · SPLENIC FLEXURE STRATEGY

Nodal Yield: A Quality Benchmark, Not Just a Count

Parameter	Reported Value	Benchmark / Comment
Median lymph nodes harvested (laparoscopic CME+CVL)	15 nodes	Meets the ≥ 12 -node adequacy threshold
Paracolic node positivity	41.0%	Distributed similarly along LCA and MCA pedicles
Gastroepiploic / splenic hilar node positivity	0%	Routine splenic hilar clearance not supported
IMA-root node positivity	0%	High/central IMA ligation is oncologically sufficient, not a mandate for splenectomy-adjacent dissection

Take-Home

Pedicle-directed lymphadenectomy along the involved arterial axis (left colic and/or middle colic) reliably achieves oncologic node counts without added morbidity from unnecessary splenic hilar or gastroepiploic dissection.

04 · SPLENIC FLEXURE STRATEGY

Three Complementary Mobilization Routes

1

Medial-to-Lateral

Enter beneath the inferior mesenteric vein, develop the retropancreatic/retrocolic plane cephalad toward the flexure

2

Lateral-to-Medial

Divide the splenocolic and phrenocolic ligaments from the white line of Toldt inward — useful when adhesions limit medial access

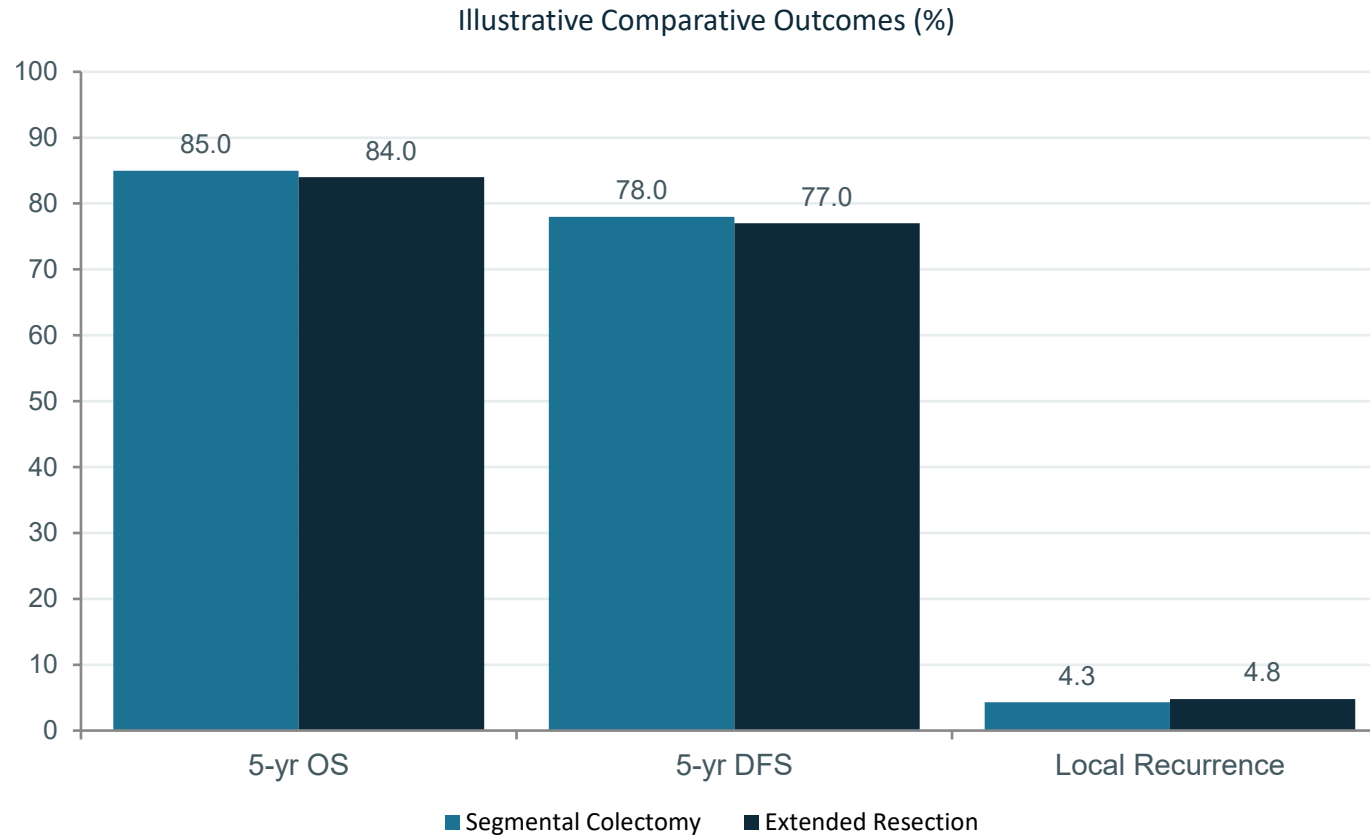
3

Inferior / Lesser-Sac

Enter the lesser sac off the greater omentum, then join the medial and lateral planes from above

Combining all three planes — a full 360° mobilization — is standard for CME with central vascular ligation and consistently allows a tension-free, well-vascularized anastomosis even across the Griffith's-point watershed.

Segmental vs. Extended Resection: Oncologic Equipoise



Why Equipoise Persists

- Multiple comparative series find **no statistically significant** survival difference by extent of resection, provided lymphadenectomy is oncologically adequate
- So, Resection extent **based on** vascular anatomy and tumor bulk, not a belief that “more radical” is always safer

SECTION V

Technology & Innovation

Minimally invasive platforms and real-time lymphatic navigation reshaping flexure surgery

Robotic Platforms Add Precision at the Watershed

Metric	Laparoscopic	Robotic-Assisted
Conversion rate	Higher	Lower
Intraoperative blood loss	Higher (median ~28 mL)	Lower (median ~0–10 mL)
LN dissection with left MCA branch division	15.0%	43.8%
Intracorporeal anastomosis rate	Lower	Higher (~34%)
Lymph node yield (right-sided)	Standard	Comparable-to-greater
Long-term oncologic outcome	Comparable	Comparable

Practical Take

- A 2020–2024 meta-analysis of 21 studies (n=50,771) found robotic colectomy favorable on several perioperative metrics with comparable oncologic outcomes
- For splenic flexure cancer, robotic assistance enabled significantly more frequent division of the middle colic artery's left branch — a technically demanding step at the watershed

ICG Fluorescence: Seeing the Lymphatic Road Map Live



Evidence Base

- In a prospective case-control series of 291 right hemicolectomies, fluorescence lymph node mapping succeeded in 98.6% of attempts
- Drainage pathway patterns differed significantly by tumor location ($p < 0.001$); a dual ileocolic + middle-colic drainage pattern was seen in 22–44% of cases depending on site
- For splenic flexure tumors, real-time ICG lymphatic mapping has been used intraoperatively to confirm the dominant pedicle before ligation
- Clinical value: converts an anatomically variable operation into an image-guided, patient-specific one

Beyond Oncology: Perfusion, Tension, and Function

1

Perfusion Assessment

ICG angiography of the proximal and distal limbs before firing the stapler — particularly valuable across the splenic flexure watershed

2

Tension-Free Anastomosis

Full mobilization (medial + lateral + inferior planes) before transection avoids undue traction on a marginal-artery-dependent segment

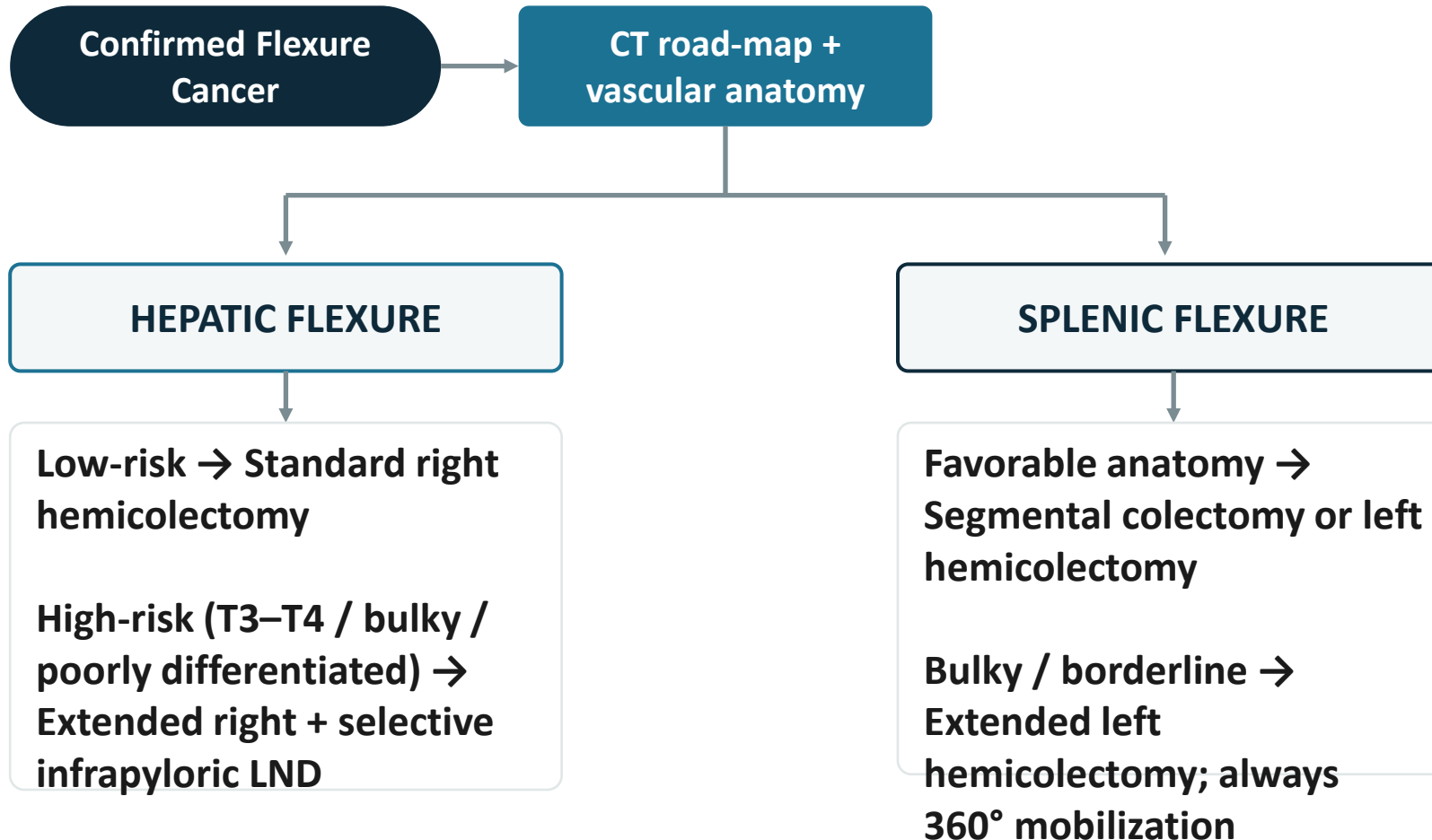
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Ileocecal / Valve Preservation

For select hepatic flexure tumors, ileocecal-sparing right colectomy preserves the valve and reduces postoperative bowel-frequency and nocturnal defecation

Ileocecal-sparing right colectomy showed shorter time to first flatus, less postoperative diarrhea, and lower nocturnal/high-frequency defecation versus traditional right hemicolectomy, with equivalent nodal yield.

A Working Algorithm — A Colorectal Surgeon's Synthesis



Common Final Pathway

- Laparoscopic/robotic CME with pedicle-level central ligation, MIS-first
- ICG perfusion check before anastomosis
- ≥ 12 nodes; MMR/MSI testing (Rt Colon)
- Adjuvant therapy per stage & risk

Take Home Messages

-  **Anatomy First** Vascular variability and watershed physiology should dictate extent of resection
-  **Map, Don't Assume** Lymph node mapping data argue against routine gastroepiploic/splenic hilar dissection
-  **Equipoise Is Real** Segmental and extended resections achieve comparable oncologic outcomes when lymphadenectomy is adequate
-  **Technology Enables Precision** Robotic platforms and ICG navigation make anatomically variable operations more precise

THANK YOU