高雄榮民總醫院

大 腸 診 療 指 引

大腸直腸癌醫療團隊 制定 2022年6月修訂

Kaohsiung Veterans GeneralHospital Colon Cancer Clinical PracticeGuidelines

Colorectal Cancer Multidisciplinary Team

June 2022 version 1

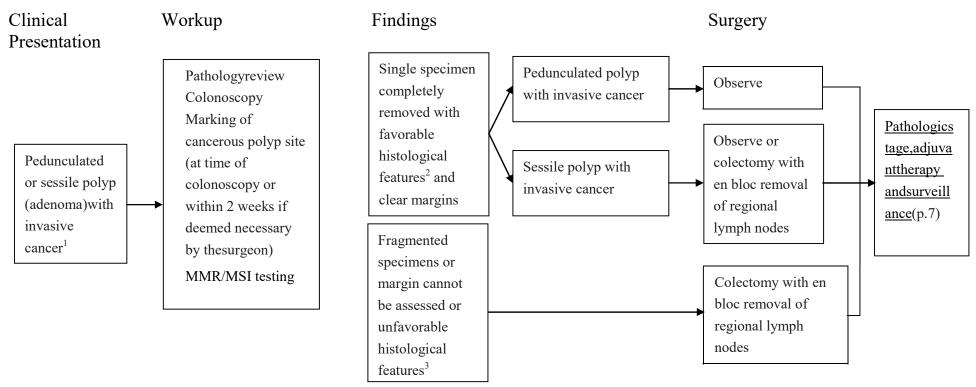
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<Revision Summary>

FOLFOXIRI replaced with FOLFIRINOX

Malignant polyp



¹A malignant polyp is defined as one with cancer invading through the muscularis mucosae and into the submucosa (pT1). pTis is not considered a "malignant polyp".

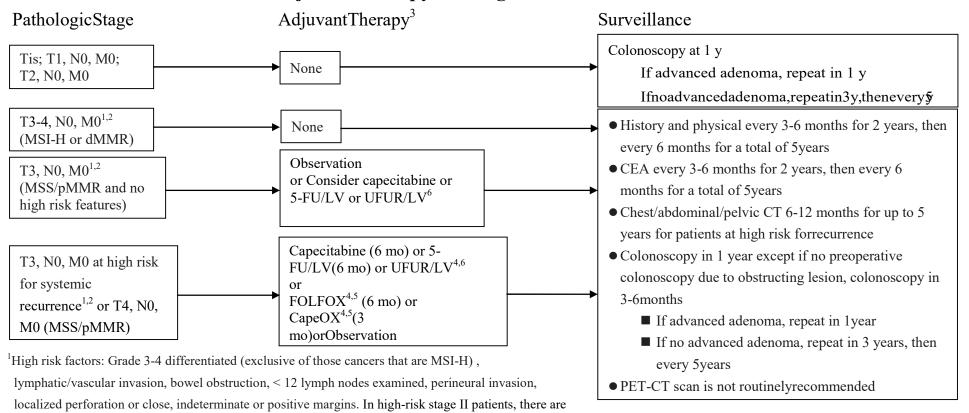
²Favorable histological features: Grade 1 & 2, no angiolymphatic invasion and negative margin of resection

³Unfavorable histological features: Grade 3 & 4, or angiolymphatic invasion, or a "positive" margin (tumour<1mm from the transected margin)

Resectable primary colon cancer

CLINICAL WORKUP FINDINGS PRIMARY TREATMENT^b

Adjuvant therapy for stage I-II colon cancer



²Testing for mismatch repair proteins (MMR) should be considered for all patients <70 Y/O or with stage II disease. Stage II MSI-H patients may have a good prognosis and do no benefit from 5-FU adjuvant therapy.

no data that correlate risk features and selection of chemotherapy.

³Bevacizumab, cetuximab, panitumumab, or irinotecan should be not used in the adjuvant setting for stage II or III patients outside the setting of a clinical trial

⁴Consider RT for T4 with penetration to a fixed structure

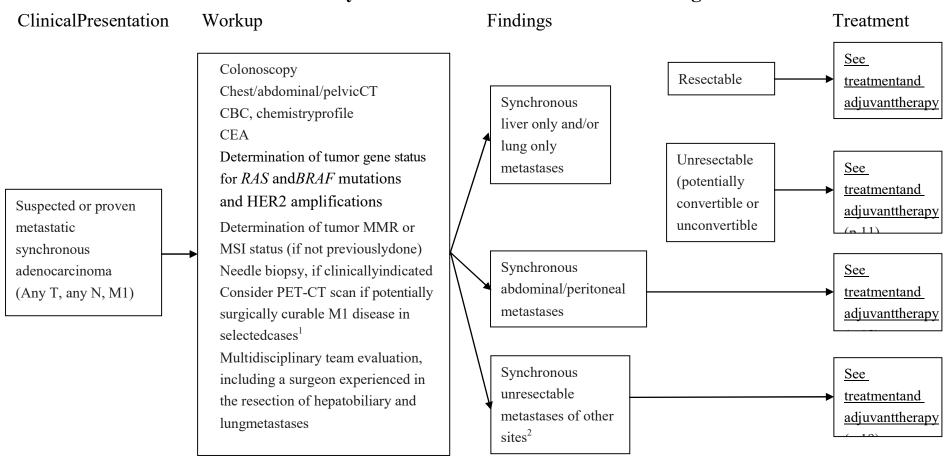
⁵A benefit for the addition of oxaliplatin to 5-FU/leucovorin in patients age 70 and older has not been proven

⁶Japanese regimen, also see<u>ChemotherapyRegimens</u>

Adjuvant therapy for stage III colon cancer

PathologicStage	AdjuvantTherapy	Surveillance			
	Droforrod:		9	107	

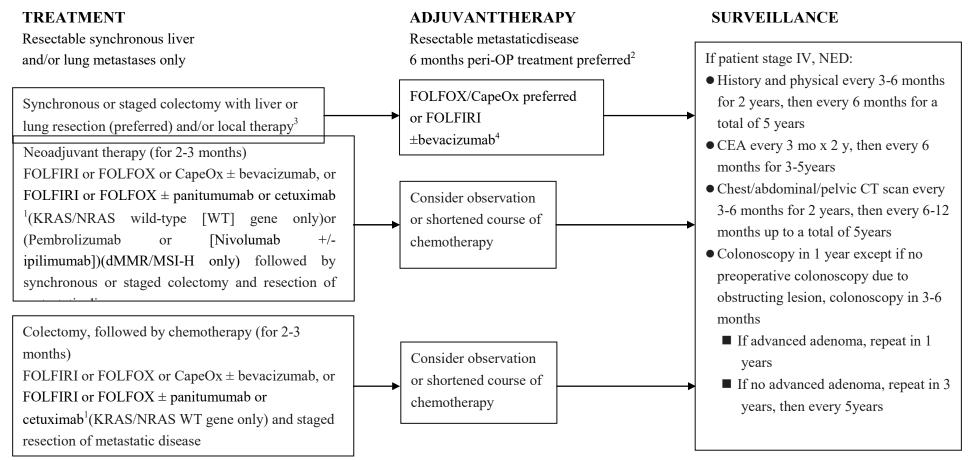
Metastatic synchronous adenocarcinoma from large bowel



¹Moulton CA, Gu CS, Law CH, et al. Effect of PET before liver resection on surgical management for colorectal adenocarcinoma metastases: a randomized clinical trial. JAMA 2014;311:1863-1869.

²Consider colon resection only if imminent risk of obstruction or significant bleeding.

Resectable synchronous liver and/or lung metastases only



¹There are conflicting data regarding the use of FOLFOX + cetuximab in patients who have potentially resectable liver metastases. ²Total duration of perioperative chemotherapy should not exceed 6 months. ³Resection is section is preferred over locally ablative precedures (eg, image-guided ablation or SBRT). However, these local techniques can be considered for liver oligometastases

⁴BMC Cancer. 2010 Oct 11;10:545. A randomized two arm phase III study in patients post radical resection of liver metastases of colorectal cancer to investigate bevacizumab in combination with capecitabine plus oxaliplatin (CAPOX) vs CAPOX alone as adjuvant treatment.

Unresectable synchronous liver and/or lung metastases only

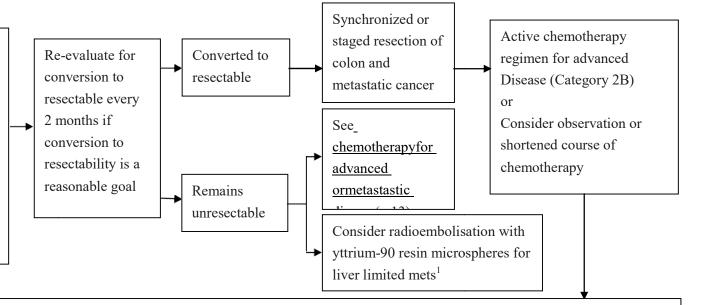
TREATMENT Unresectable synchronous liver Official and/official and/of

Systemic therapy (FOLFIRI or FOLFOX or CapeOX ± bevacizumab,or FOLFIRI or FOLFOX or FOLFIRINOX ± panitumumab or cetuximab [KRAS /NRAS WT gene only] or,FOLFIRINOX ±bevacizumab)

and/or lung metastases only

[Nivolumab +/-ipilimumab] or Pembrolizumab(preferred)(dMMR/MSI-H only)

Consider colon resection only if imminent risk of obstruction or



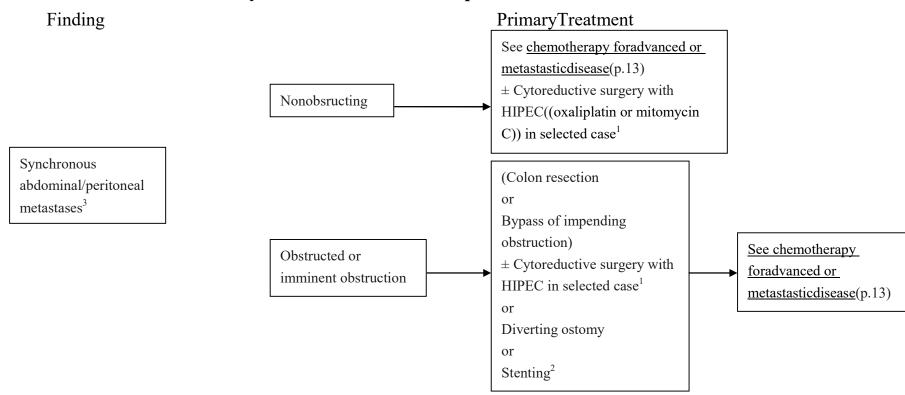
SURVEILLANCE

If patient stage IV, no eidence of disease (NED):

- History and physical every 3-6 months for 2 years, then every 6 months for a total of 5 years
- CEA every 3 months for 2 years, then every 6 months for 3-5 years
- Chest/abdominal/pelvic CT scan every 3-6 months for 2 years, then every 6-12 months up to a total of 5 years
- Colonoscopy in 1 year except if no preoperative colonoscopy due to obstructing lesion, colonoscopy in 3-6months
 - If advanced adenoma, repeat in 1 year
 - If no advanced adenoma, repeat in 3 years, then every 5 years

Not documented in NCCN guideline 2015 v2 but in ESMO guideline 2014(evidence grade IVB). Also refer to reference [9]

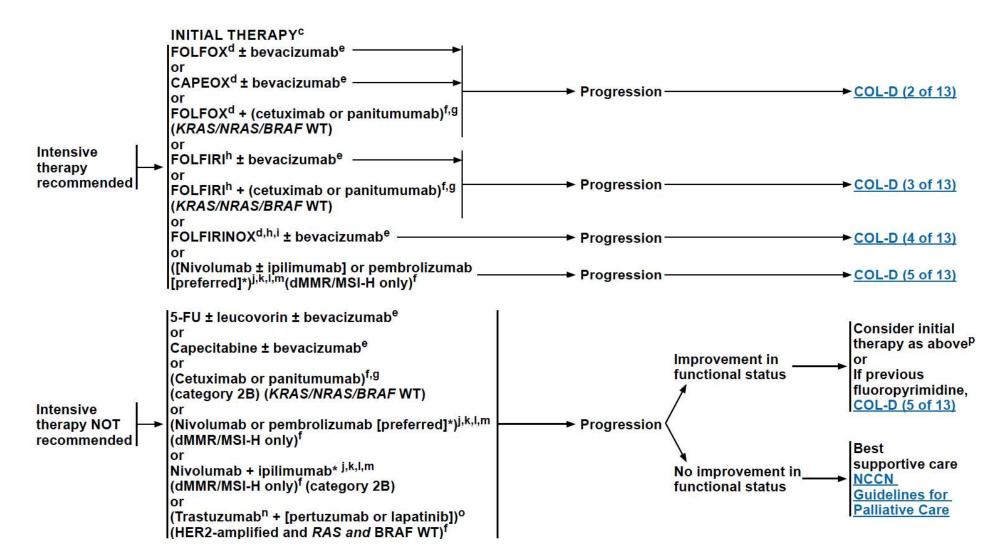
Synchronous abdominal/peritoneal metastases

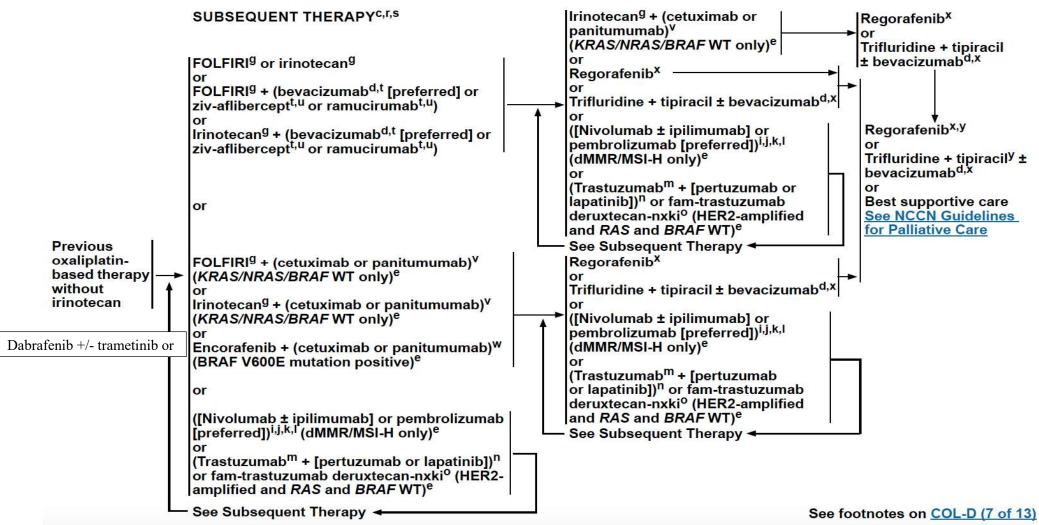


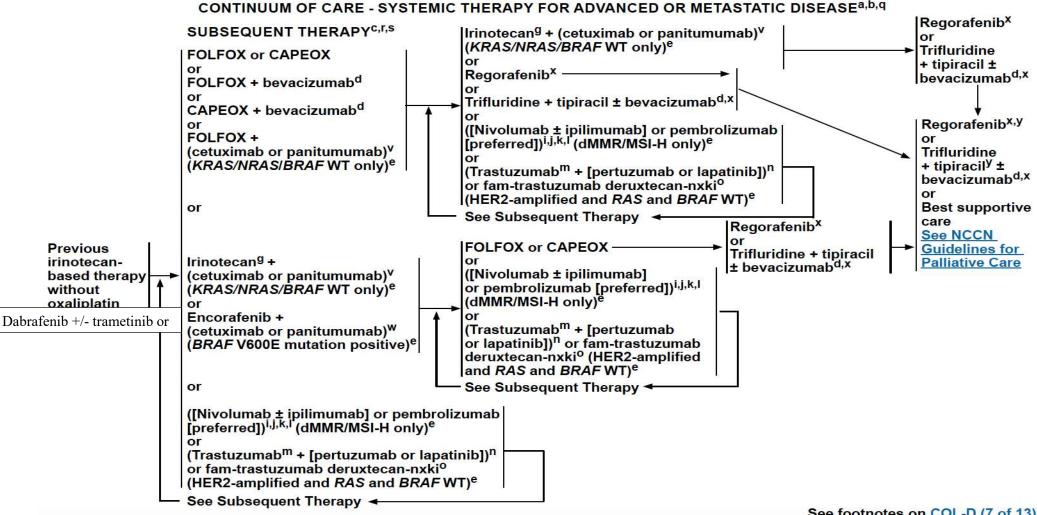
¹HIPEC = Hyperthermic Intraperitoneal Chemotherapy; Not documented in NCCN guideline 2015 v2 but in ESMO guideline 2014(evidence grade IVB). Also refer to Reference [7], [8]

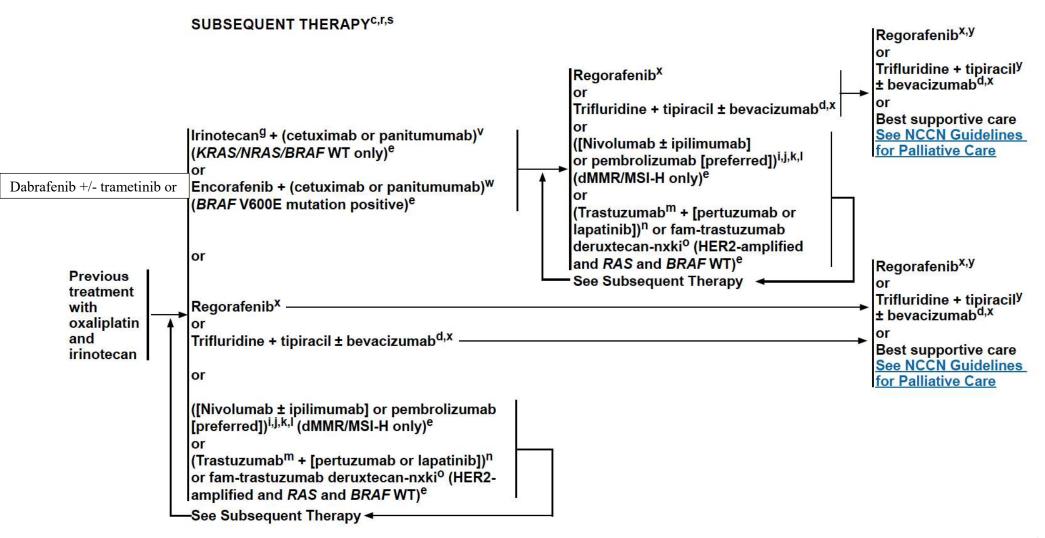
²Not available in VGHKS now

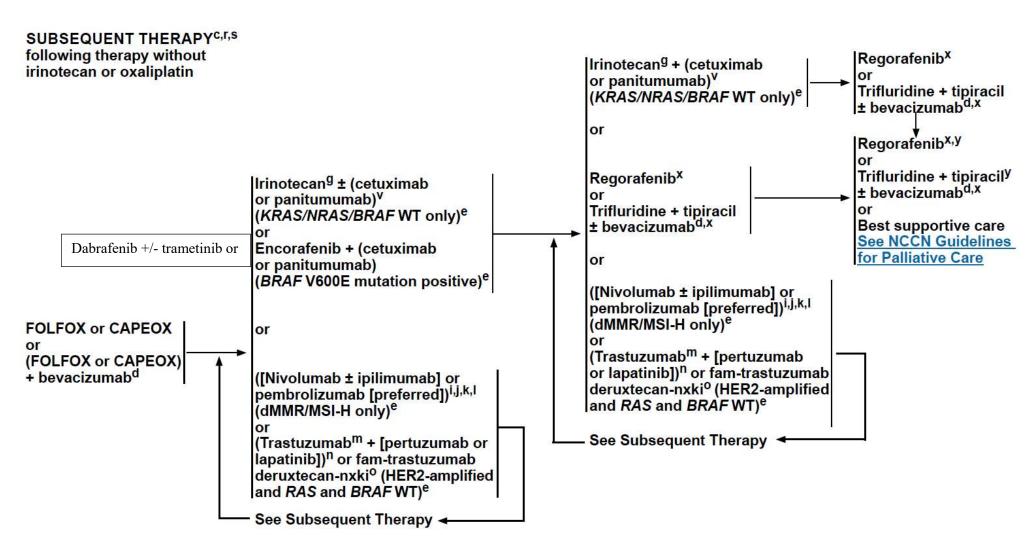
³Aggressive cytoreductive debulking and/or intraperitoneal chemotherapy are not recommended outside the setting of a clinical trial. If R0 resection can be achieved, surgical resection of isolated peritoneal disease may be considered at expertienced centers.





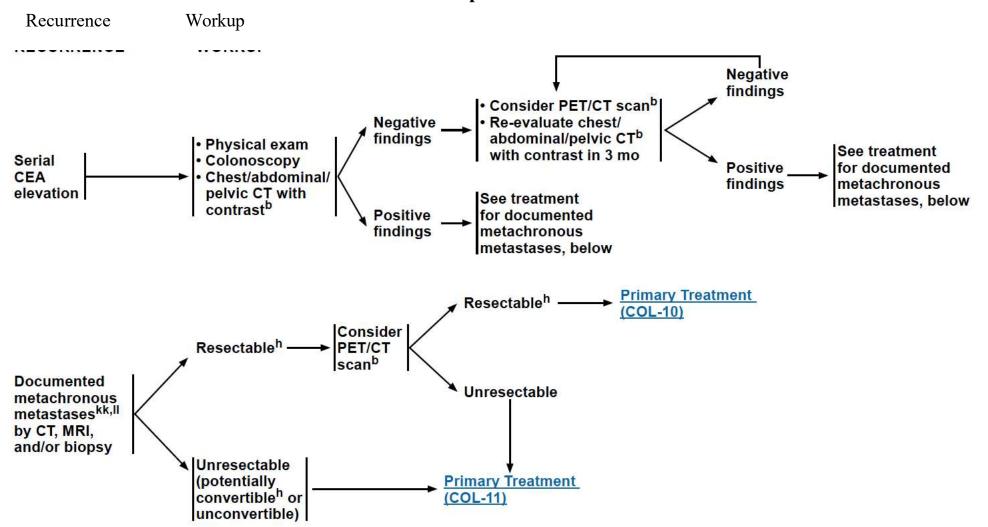




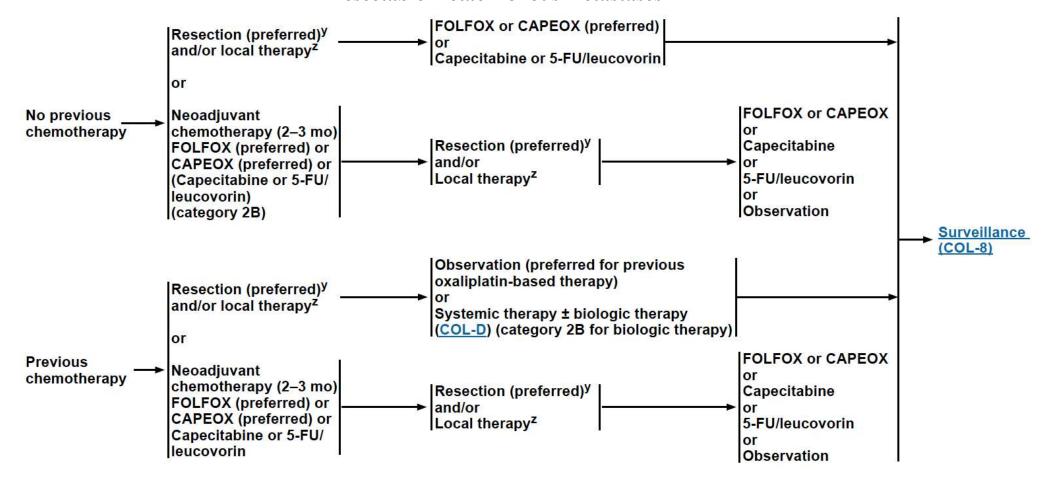


Initial therapy Subsequent Therapy

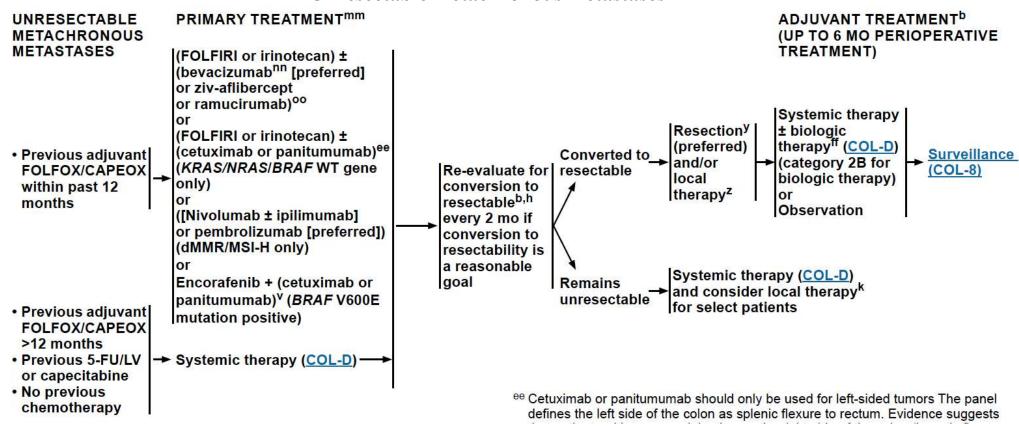
Workup for recurrence



Resectable metachronous metastases



Unresectable metachronous metastases



Principles of Chemotherapy

LV Dosage:

Leucovorin 400 mg/m2 is the equivalent of levoleucovorin 200 mg/m2

Chemotherapy for Advanced/Metastatic disease

All CRC chemotherapy regimens according to patient's condition and guidelines NHI regulation:

Bevacizumab combine with Irinotecan base or 5-FU base regimens at the 1st line treatment Cetuximab combine with Irinotecan or oxaliplatin base regimens at the 1st line & the 3rd line treatment

Panitumumab combine with Irinotecan or oxaliplatin base regimens at the 1st line treatment

Regorafenib at the third/fourth[K-ras wild type] line treatment

Adjuvant Chemotherapy Regimen

Oxaliplatin base (including mFOLFOX6, CapeOX, FLOX)

5-FU base chemotherapy (IV form 5-FU, Capecitabine, Ufur/LV)

NHI regulation:

Oxaliplatin: Stage III colon cancer

Xeloda: Stage III colon cancer, stage IV colorectal cancer

5-FU/LV: High risk stage II, stage III and stage IV colorectal cancer Ufur/LV: High risk stage II, stage III and stage IV colorectal cancer

Chemotherapy Regimens for Advanced/Metastatic Disease (1 of3)

FOLFOX

mFOLFOX6 (may add with Bevacizumab/Panitumumab/Cetuximab)

Oxaliplatin 85 mg/m² IV over 2 hours, day 1

Leucovorin 400 mg/m² IV over 2 hours, day 1

5-FU $400 \text{ mg/m}^2\text{IV}$ bolus on day 1, then 1200 mg/m^2 /day x 2 days

(total 2400 mg/m² over 46–48 hours) IV continuous infusion

Repeat every 2weeks

CapeOX(may add with Bevacizumab)

Oxaliplatin 130 mg/m² IV over 2 hours, day 1

Capecitabine 850–1000mg/m² twice daily PO for 14 days

Repeat every 3 weeks

$\textbf{FOLFIRI} \ (\textit{may add with Bevacizumab/Panitumumab/Cetuximab/Ziv-aflibercept/Ramucirumab})$

Irinotecan 180 mg/m² IV over 30–90 minutes, day 1

Leucovorin* 400 mg/m² IV infusion to match duration of irinotecan infusion, day 1 5-FU 400 mg/m² IV bolus day 1, then 1200 mg/m²/day x 2 days (total 2400 mg/m² over 46–48 hours) continuous infusion

Repeat every 2 weeks

FOLFIRINOX(may add with Bevacizumab)

Irinotecan 165 mg/m² IV day 1,

oxaliplatin 85 mg/m² day 1,

leucovorin 400 mg/m² day 1, fluorouracil 1600 mg/m²/day x 2 days (total 3200 mg/m² over 48 hours) continuous infusion starting on day 1.

Repeat every 2 weeks

TARGET THERAPY

Repeat every 2 weeks (unless additional mention)

+ Bevacizumab

Bevacizumab 5 mg/kg IV, day 1 or Bevacizumab 7.5 mg/kg IV, day 1 (for Capecitabine based)

+ Panitumumab (KRAS/NRAS WT gene only)

Panitumumab 6 mg/kg IV over 60 minutes, day 1

+ Cetuximab (KRAS/NRAS WT gene only)

Cetuximab 400 mg/m² IV over 2 hours first infusion, then 250 mg/m² IV over 60 minutes weekly

or Cetuximab 500 mg/m² IV over 2 hours, day 1

+ Ziv-aflibercept (FOLFIRI)

Ziv-aflibercept 4 mg/kg IV, day 1

+ Ramucirumab² (FOLFIRI)

Ramucirumab 8mg/kg over 60 minutes, day 1

+ Regorafenib (Single use or with FOLFIRI³)

Regorafenib 160 mg PO daily days 1-21 Repeat every 28 days

 $Trifluridine + tipiracil^2$

35mg/m2 up to a Max doas of 80 mg per dose (based on trifluridine component)

PO twice daily days 1-5 and 8-12

repeat every 28 days

Chemotherapy Regimens for Advanced/Metastatic Disease (2 of3)

Bolus or infusional 5-FU/leucovorin	Irinotecan based		
Roswell Park regimen	IROX		
Leucovorin 500 mg/m ² IV over 2 hours, days 1, 8, 15, 22, 29, and 36 5-FU 500 mg/m ² IV bolus 1 hour after start of leucovorin, days 1, 8, 15, 22, 29, and 36 Repeat every 8 weeks	Oxaliplatin 85 mg/m ² IV over 2 hours, followed by irinotecan 200 mg/m2 over 30-90 minutes every 3 weeks		
Simplified biweekly infusional 5-FU/LV (sLV5FU2)	Irinotecan (may add with Cetuximab)		
Leucovorin 400 mg/m² IV over 2 hours on day 1, followed by 5-FU bolus 400 mg/m² and then 1200 mg/m² /day x 2 days (total 2400 mg/m² over 46-48 hours) continuous infusion Repeat every 2 weeks Weekly Leucovorin 20 mg/m² IV over 2 hours on day 1, 5-FU 500 mg/m² IV bolus injection 1 hour after the start of leucovorin. Repeat weekly. 5-FU 2600 mg/m² by 24-hour infusion plus leucovorin 500 mg/m².	Irinotecan 125 mg/m² IV over 30-90 minutes, days 1 and 8 Repeat every 3weeks or Irinotecan 180 mg/m² IV over 30-90 minutes, day1 Repeat every 2weeks or Irinotecan 300-350 mg/m²IV over 30-90 minutes, day 1 Repeat every 3weeks		
Repeat every week (<u>AIO regimen</u> ⁴ : lecovorin 500 mg/m ² in N/S 250ml over 2 hours followed by 5-FU 2600 mg/m ² in N/S 500ml by 24-hour infusion weekly x6 and 2 weeks off, repeat every 8 weeks)	Capecitabine (may add with Bevacizumab) 850–1250 mg/m ² PO twice daily, days 1–14 Repeat every 3 weeks		
Mayo Clinic regimen ⁴	Ufur/LV ¹		
Leucovorin 20 mg/m ² /day IV over 30 minutes followed by 5-FU IV bolus 425 mg/m ² /day x 5 days. Repeat every 5 weeks	Leucovorin 20-30 mg/m ² + Ufur 300-500 mg/ m ² PO at day 1 to 28 in every 35 days		

Chemotherapy Regimens for Advanced/Metastatic Disease (3 of3)

Modified regimen for CRS@VGHKS	Ю
modified mFOLFOX	Nivolumab + ipilimumab
Oxaliplatin 85-100 mg/ m ² IV over 3 hours on day 1	Nivolumab 3 mg/kg (30 minute IV infusion) and ipilimumab 1
Leucovorin 200 mg/ m ² IV over 1 hours after Oxaliplatin on day 1	mg/kg (30 minute IV infusion) once every 3 weeks for four doses,
5-FU 2600 mg/m ² IV continuous infusion over 18 hours (start on	then nivolumab 3 mg/kg IV or nivolumab 240 mg IV every 2
day 1) Repeat every 2 weeks	weeks.
modified FOLFIRI	
Irinotecan 180 mg/m ² IV over 90 minutes, day 1	
Leucovorin 200 mg/m ² IV infusion for 1 hours after irinotecan infusion,	
day 1 5-FU 2400-3000 mg/m ² continuous infusion over 18 hours (start	
on day 1) Repeat every 2 weeks	
modified AIO regimen	
lecovorin 250 mg/m ² in N/S 250ml over 1 hours followed by 5-FU 2600	
mg/m^2	
in N/S 500ml by 18-hour infusion weekly x6 and 2 weeks off, repeat	
every 8 weeks	

¹Japanese regimen, is the equavalent of 5-FU/LV or capecitabine in adjuvant and advanced/metastatic therapy. Also refer to Reference[4], [5] and [6]

²Not available in routine practice in Taiwan now

³As third/fourth line chemotherpy for advanced/metastatic disease, based on reference[10]

⁴At VGHKS

Chemotherapy Regimens for Adjuvant Therapy (1 of2)

mFOLFOX6 ³	5-FU/leucovorin
Oxaliplatin 85 mg/m ² IV over 2 hours, day 1	Rosewell Park regimen (?)
Leucovorin 400 mg/m ² IV over 2 hours, day 1 5-FU 400 mg/m ² IV bolus on day 1, then 1200 mg/m ² /day x 2 days (total 2400 mg/m ² over 46–48 hours) IV continuous infusion	Leucovorin 500 mg/m ² given as a 2-hour infusion and repeated weekly x 6. 5-FU 500 mg/m ² given bolus 1 hour after the start of leucovorin and repeated weekly x 6. Every 8 weeks for 4 cycles
Repeat every 2weeks	
FLOX ²	Simplified biweekly infusional 5-FU/LV (sLV5FU2)
5-FU 500 mg/m² IV bolus weekly x 6 + leucovorin 500 mg/m² IV weekly x 6, each 8-week cycle x 3 with oxaliplatin 85 mg/m² IV administered on weeks 1, 3, and 5 of each 8-week cycle x 3	Leucovorin 400 mg/m ² IV over 2 hours on day 1, followed by 5-FU bolus 400 mg/m ² and then 1200 mg/m ² /day x 2 days (total 2400 mg/m ² over 46-48 hours) continuous infusion Repeat every 2 weeks
Capecitabine	- Repeat every 2 weeks
1250 mg/m ² PO twice daily, days 1–14 every 3 weeks x 24 wks	
CapeOX	AIO regimen ⁴
Oxaliplatin 130 mg/m ² IV over 2 hours, day 1 Capecitabine 850–1000mg/m ² twice daily PO for 14 days Repeat every 3 weeks x 24 weeks	Lecovorin 500 mg/m ² in N/S 250ml over 2 hours followed by 5-FU 2600 mg/m ² in N/S 500ml by 24-hour infusion weekly x6 and 2 weeks off, repeat every 8 weeks
Ufur/LV ¹	Mayo Clinic regimen ⁴
Leucovorin 20-30 mg/m ² + Ufur 300-500 mg/ m ² PO at day 1 to 28 in every 35 days	Leucovorin 20 mg/m2/day IV over 30 minutes followed by 5-FU IV bolus 425 mg/m2/day x 5 days. Repeat every 5 weeks

¹Japanese regimen, is the equavalent of 5-FU/LV or capecitabine in adjuvant and advanced/metastatic therapy. Also refer to Reference[4], [5] and [6]

²FLOX is an alternative to FOLFOX or CapeOx but FOLFOX or CapeOx are preferred

³FOLFOX is reasonable for high-risk or intermediate-risk stage II patients and is not indicated for good- or average-risk patients with stage II colon cancer

⁴At VGHKS

Chemotherapy Regimens for Adjuvant Therapy (2 of2)

Modified regimen for CRS@VGHKS

modified mFOLFOX

Oxaliplatin 85-100 mg/ m² IV over 3 hours on day 1

Leucovorin 200 mg/ m² IV over 1 hours after Oxaliplatin on day 1

5-FU 2600 mg/m² IV continuous infusion over 18 hours (start on day 1)

Repeat every 2 weeks

modified AIO regimen

Lecovorin 250 mg/m² in N/S 250ml over 1 hours followed by 5-FU 2600 mg/m² in N/S 500ml by 18-hour infusion weekly x6 and 2 weeks off, repeat every 8 weeks

癌症藥物停藥準則

- 1. 根據影像學檢查或臨床依據,針對目前癌症用藥反應效果不良者。
- 2. 癌症用藥期間,產生藥物不良反應者,或初次發生輕微藥物不良反應後,經調降劑量或處置,仍再次發生藥物不良或更嚴重之反應者。
- 3. 評估 adverseeffects(AEs)分級為第三級以上或任何無法承受之併發症者。
- 4. 評估Eastern CooperativeOncologyGroup(ECOG) Performance Status \geq 3 者。
- 5. 經病人意願無法接受及配合持續治療,但經醫師解釋說明後,仍是無法接受癌症用藥或拒絕持續治療者。

Reference

- 1. Major base on NCCN Colon Cancer Clinical Practice Guidelines Version1. 2021
- 2. ESMO Clinical Practice Guidelines 2014: Gastrointestinal cancers -- section: Metastatic Colorectal Cancer, Early Colon Cancer, Rectal Cancer and AnalCancer
- 3. NHI regulations for CRCchemotherapy
- 4. Efficacy of oral UFT as adjuvant chemotherapy to curative resection of colorectal cancer: multicenter prospective randomized trial. Kato T, Ohashi Y, Nakazato H, Koike A, Saji S, Suzuki H, Takagi H, Nimura Y, Hasumi A, Baba S, Manabe T, Maruta M, Miura K, Yamaguchi A. *Langenbecks Arch Surg.* 2002Mar;386(8):575-81.
- 5. The role of UFT in metastatic colorectal cancer. Bennouna J, Saunders M, Douillard JY. Oncology. 2009; 76(5):301-10.
- 6. Oral uracil and tegafur plus leucovorin compared with intravenous fluorouracil and leucovorin in stage II and III carcinoma of the colon: results from National Surgical Adjuvant Breast and Bowel Project Protocol C-06. Lembersky BC, Wieand HS, Petrelli NJ, O'Connell MJ, Colangelo LH, Smith RE, Seay TE, Giguere JK, Marshall ME, Jacobs AD, Colman LK, Soran A, Yothers G, Wolmark N. J Clin Oncol. 2006 May 1;24(13):2059-64.
- 7. Dominique Elias et al. Complete Cytoreductive Surgery Plus Intraperitoneal ChemohyperthermiaWith Oxaliplatin for Peritoneal Carcinomatosis of Colorectal Origin, J Clin Oncol 27:681-685.2008
- 8. *Vic J. Verwaalet al.* 8-Year Follow-up of Randomized Trial: Cytoreduction and Hyperthermic Intraperitoneal Chemotherapy Versus Systemic Chemotherapy in Patients with Peritoneal Carcinomatosis of Colorectal Cancer, *Annals of Surgical Oncology* 15(9):2426–2432.2008
- 9. Hendlisz A, Van den Eynde M, Peeters M et al. Phase III trial comparing protracted intravenous fluorouracil infusion alone or with yttrium-90 resin microspheres radioembolization for liver-limited metastatic colorectal cancer refractory to standard. J Clin Oncol 2010; 28:3687–3694.
- 10. Chien-YuLu et al. FOLFIRI and regorafenib combination therapy with dose escalation of irinotecan as fourth-line treatment for patients with metastatic colon cancer according to UGT1A1 genotyping, OncoTargets Ther. 2014; 7:2143–2146

Appendix and Additional Information

1. Dosage of irinotecan in mFOLFIRI + Avstin regimen could be titrated up to 260mg/m² in patient with 6TA/6TA in genotyping of UGT1A1. This is based on the ongoing reseach: **Prospective analysis of** *UGT1A1* **promoter polymorphism for irinotecan dose escalation in metastatic colorectal cancer patients treated with bevacizumab combined with FOLFIRI as the first-line setting**by Dr. Wang