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**The Cover Shot**

This snapshot was taken from a fixed wing aircraft over Victoria Harbour during a navigation exercise.

Despite having flown for over two decades in Hong Kong, each experience continues to be fascinating. Bird’s eye view of the most spectacular metropolis in the world lets me appreciate our gifted “pearl city”. The great diversity of local weather adds colour to these amazing scenes.

Aviation and medicine let us explore the myths and wonders of nature and the human body. Adventure in them humbles us as we realise our limitations and stay awed at the wonderful work of the Creator.
Gastroenterology: Advanced Diagnostics and Personalised Medicine

Prof Justin CY WU

MBChB (CUHK), MD (CUHK), FHKCP, FHKAM, FRCP (London), FRCP (Edinburgh)
Professor, Institute of Digestive Disease, Department of Medicine & Therapeutics, The Chinese University of Hong Kong

Editor

In this month’s issue of the Hong Kong Medical Diary, we have an updated review on the development of advanced diagnostics and how it facilitates the development of personalised medicine in the field of gastrointestinal.

The introduction of artificial intelligence (AI) has further improved the diagnostic power of endoscopy in the early detection of advanced dysplasia and early gastric cancer. AI-enabled endoscopy also facilitates endoscopic management of early neoplasia. It allows more accurate prediction of early neoplasia that is amenable for endoscopic submucosal dissection. For hyperplastic polyps at the rectosigmoid region, AI may facilitate more accurate selection of polyps for “diagnose and leave” approach. The clinical impact of AI will be further enhanced by the improvement in image resolution of endoscopy and image-enhancing technology.

The implementation of colorectal cancer (CRC) screening becomes more personalised with the understanding of the increased CRC risk in family members of CRC patients. The risk is further affected by the age of cancer diagnosis of the index patient, the age of the individual at-risk, being a first-degree relative, and the number of affected relatives. Current recommendations have suggested earlier and shorter interval of CRC screening. And colonoscopy is the preferred screening test for its higher sensitivity.

The discovery of the role of intestinal microbiota in the pathogenesis and management of CRC creates the opportunity for the development of novel microbiota-based personalised prevention and management of CRC. Patients with advanced adenoma or CRC may be characterised by a distinct pattern of dysbiosis. Stool microbiota analysis may be an emerging tool that helps select individuals for more targeted screening with the use of more sensitive screening method such as colonoscopy. The microbiota can also be used to predict treatment responses and adverse reactions, and the modulation of the microbiota could potentially facilitate more personalised treatment and improve patient outcomes.

The widespread application of high-resolution manometry has revolutionised the diagnosis of oesophageal motility disorders. The Chicago Classification 4.0 further refines the protocol of high-resolution manometry with the addition of manoeuvres such as multiple rapid swallows and free drink challenges. This revision allows more accurate assessment of oesophageal dysmotility and classification of an oesophageal motility disorder. The functional luminal imaging probe (FLIP) technology is a promising tool that measures the stiffness and distensibility of the oesophageal wall and esophagogastric junction. FLIP has emerged as an adjunct to high-resolution manometry with increasing clinical applicability for the diagnosis of oesophageal dysmotility and early gastric cancer. AI-enabled endoscopy also facilitates more accurate selection of polyps for “diagnose and leave” approach.

Despite the decreasing incidence, gastric cancer remains a common cancer in Hong Kong. The potential association between long-term proton pump inhibitor (PPI) use and the risk of gastric cancer has created major concern among long-term PPI users. Mounting evidence suggests that the risk is significant only in a subset of individuals with pre-existing gastric precancerous lesions and H. pylori infection. A personalised approach should be taken in balancing the individual’s risk-benefit profile for long-term PPI treatment.
## Certificate Course on Respiratory Medicine 2021 (Video Lectures)

**Objectives:**
To enhance understanding and provide recent updates in various aspects of Respiratory medicine

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<td>6 Oct 2021</td>
<td>Indication, monitoring and troubleshooting for CPAP therapy</td>
<td>Ms. Maggie Lit KCC NC(Respiratory) / OEH NC(Respiratory)</td>
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**Date:** 1, 8, 15, 29 September & 6 October 2021 (Wednesday, skip 22 September, public holiday)

**Time:** 7:00 p.m. – 9:00 p.m. (2 hours per session)

**Course Feature:** Video lectures (with Q&A platform for participants to post the questions)

**Quiz for doctors:** To tie in with the CME requirements for video lectures, DOCTORS are required to complete a quiz after the completion of each lecture

**Language Media:** Cantonese (Supplemented with English)

**Course Fee:** HK$1,200 (5 sessions)

**Certificate:** Awarded to participants with a minimum attendance of 70%

**Deadline:** 24 August 2021

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Effects of Long-term Use of Proton Pump Inhibitors on Gastric Cancer Development

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The University of Hong Kong Queen Mary Hospital, Hong Kong

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INTRODUCTION

Gastric cancer (GC) is the fifth commonest cancer and the third leading cause of cancer-related mortality worldwide. Helicobacter pylori (H. pylori) is the most important aetiological agent for GC development with a 2.8-fold higher risk. H. pylori induces gastric carcinogenesis via the Correa’s cascade, starting from chronic gastritis and progressing to precancerous lesions (atrophic gastritis, intestinal metaplasia [IM], dysplasia) and cancer. However, eradication of H. pylori can only reduce GC risk by 46%, as shown in a recent meta-analysis of seven randomised controlled trials (RCTs), due to the presence of pre-existing precancerous lesions. Eradication of H. pylori can reverse chronic gastritis and atrophic gastritis, and even IM; in fact, H. pylori eradication reduces GC risk even in patients with IM and dysplasia, and those undergoing endoscopic resection for early GC. However, the probability of IM reversal decrease with increasing Operative Link on Gastric Intestinal Metaplasia Assessment (OLGIM) stages.

Emerging data have shown that long-term use of proton-pump inhibitors (PPIs) are associated with a number of gastrointestinal and extraintestinal side effects, including enteric infections, acute kidney injury, fracture and pneumonia. Among the gastrointestinal side effects, PPI-associated GC has come under the spotlight recently. In this review, we will discuss the possible underlying mechanisms and recent evidence from clinical studies. We will also provide recommendations on PPI prescription in clinical practice.

POSSIBLE MECHANISMS BY WHICH PROTON-PUMP INHIBITORS PROMOTE GASTRIC CARCINOGENESIS

While acid suppression by PPIs has been shown to cause gastric neoplasia in rodents, evidence from human studies remains controversial. Proposed mechanisms include interaction with H. pylori, hypergastrinemia, and bacterial overgrowth (Fig. 1).

Interaction with Helicobacter pylori

H. pylori colonises gastric antrum leading to antrum-predominant gastritis with hypersecretion of gastric acid. However, PPIs result in corpus-predominant gastritis in the presence of H. pylori infection, resulting in atrophic gastritis (a precancerous lesion) and hypochlorhydria.

Hypergastrinemia

A systematic review showed that long-term (> 3 years) PPI use leads to an elevated level of serum gastrin in response to hypochlorhydria, which poses a trophic effect on gastric mucosa, including hyperplasia of enterochromaffin-like (ECL) cells, particularly in H. pylori-infected patients. In addition, hypergastrinemia may stimulate the release of signal substances (e.g. histamine, regenerating gene [REG] protein) from the ECL cells, thereby fostering the growth of gastric carcinomas of “intestinal type”.

Bacterial Overgrowth

Acid suppression by PPIs can lead to non-H. pylori bacterial overgrowth in the stomach, which may in turn exacerbate chronic gastritis and hence atrophic gastritis. H. pylori and non-H. pylori bacteria act synergistically to incite higher serum cytokines
(interleukin [IL]-1 beta and IL-8) and atrophic gastritis. In addition, there is a higher abundance of non-gastric micro-organisms (mostly oral flora), which can produce gastric carcinogens (N-nitroso compounds) from food nitrates via nitrate reductase.\textsuperscript{15}

**CLINICAL STUDIES ON THE ASSOCIATION BETWEEN PROTON-PUMP INHIBITORS AND GASTRIC CANCER**

A prior meta-analysis of three observational studies showed that PPIs were associated with a higher GC risk (pooled odds ratio [OR]: 1.43, 95% CI: 1.23-1.66).\textsuperscript{16} Interestingly, a significant association was only observed among those using PPIs < 1 year (pooled OR: 1.76, 95% CI: 1.24-2.52) but not those using PPIs ≥ 1 year. This observation was probably related to the fact that PPIs are part of the \textit{H. pylori} eradication regimen. Nevertheless, the highest GC risk existed if patients used PPIs > 3 years (pooled OR: 2.45, 95% CI: 1.41 - 2.45), which may be due to the synergistic action of PPIs and \textit{H. pylori} on increasing GC risk.

As GC is relatively uncommon and a sufficiently long observation period is needed to develop, randomised clinical trials (RCTs), studying the effects of PPIs requires a large sample size and are resource/labor-intensive. It is also unethical to conduct a trial to observe adverse events as the primary outcome of interest. Therefore, observational studies with good study design and addressing important biases and confounding variables are the best available evidence. However, the observational studies included in the above-mentioned meta-analysis did not have a large sample size, and failed to take into consideration of \textit{H. pylori} infection status, indication bias reverse causality, and concomitant usage of other medications including aspirin, non-aspirin non-steroidal anti-inflammatory drugs (NA-NSAIDs), cyclooxygenase-2 (COX-2) inhibitors, statins and metformin.\textsuperscript{10}

To address these limitations, we conducted a territory-wide retrospective cohort study on 63,397 \textit{H. pylori} eradicated patients with a median follow-up of 7.6 years.\textsuperscript{17} PPI use (defined as at least weekly use) was associated with a 2.4-fold higher GC risk, while histamine two receptor antagonists (H2RAs), a negative control exposure, did not confer a higher risk. A frequency- and duration-response relationship existed (adjusted hazard ratio [aHR] 2.43 for weekly to < daily use, and aHR 4.55 for daily use; and aHR 5.04, 6.65 and 8.34 for ≥ 1-year, ≥ 2-year and ≥ 3-year use, respectively).

Subsequently, several other publications were echoing our study results. A recent meta-analysis of seven studies showed that PPIs were associated with a 2.5-fold higher GC risk.\textsuperscript{18} In another meta-analysis, it was found that the risk was more prominent among Asians than Caucasians (OR: 2.44 [95% CI: 1.89-3.00] vs OR: 1.86 [95% CI: 0.54-3.18]), and for non-cardia than cardia subsite (OR: 2.45 [95% CI: 1.44-3.45] vs OR: 1.64 [95% CI: 0.23-3.51]).\textsuperscript{19} Furthermore, the risk appears to be more prominent among \textit{H. pylori}-infected (standardised incidence ratio [SIR]: 9.76, 95% CI: 8.87-10.71) than uninfected patients (SIR: 2.91, 95% CI: 2.78-3.05).\textsuperscript{20} Notably, in a retrospective cohort study of 571 \textit{H. pylori}-eradicated patients in Japan, which also considered the presence of gastric precancerous lesions (atrophic gastritis and IM),\textsuperscript{21} PPI use was associated with a higher GC risk in patients with IM but not those without IM. In our territory-wide cohort study, we recruited a matched cohort of PPI users who had not received \textit{H. pylori} therapy \textit{(n}=142,460), showing that PPI users without prior HP therapy had the lowest incidence rate of GC (0.8 cases per 10,000 person-years vs other two groups [non-PPI users with prior \textit{H. pylori} therapy: 2.9 per 10,000 person-years and PPI users with prior \textit{H. pylori} therapy: 8.1 per 10,000 person-years]).\textsuperscript{17} Taken together, the evidence suggests that pre-existing precancerous lesions (e.g. induced by current or even prior \textit{H. pylori} infection) plays a more important role in determining GC risk than PPIs, and PPIs likely increase GC risk significantly in the context of underlying precancerous lesions or \textit{H. pylori} infection.

However, the causality between PPIs and GC development warrants further investigation as current evidence is still conflicting due to the presence of residual/unmeasured confounders inherent in all observational studies. For instance, important risk factors such as lifestyle factors, or family history of GC were not factored into analysis in some studies. In a nested case-control study with 1,233 GC cases, PPI use of ≥ 2-years was not associated with a higher risk of GC and consistent association was not found for increasing PPI dose.\textsuperscript{22} In a 3 x 2 partial factorial double-blinded RCT, 17,598 subjects (taking aspirin and/or rivaroxaban for underlying cardiovascular or peripheral artery diseases) were randomly assigned to either pantoprazole 40mg daily or placebo.\textsuperscript{25} Although no increased risk of all gastrointestinal cancers (n=169) was observed, the number of GC cases was not specified. An issue of underpower was likely present given the few cases of gastric atrophy (n = 45). Other limitations include a short follow-up time (median of 3 years) and concomitant use of aspirin in a large proportion of subjects. A meta-analyses reported that aspirin was associated with a 36% lower risk of GC via COX-2 and non-COX-2 pathways.\textsuperscript{24} Post-hoc analysis of our territory-wide cohort study showed that PPI-associated GC risk was negated by concurrent aspirin use.\textsuperscript{25}

**RECOMMENDATIONS ON PRESCRIPTION OF PROTON-PUMP INHIBITORS IN CLINICAL PRACTICE**

It could not be over-emphasised that PPIs should be prescribed in the presence of clinical indications (e.g. peptic ulcer disease, gastroesophageal reflux disease [GERD], prevention of NSAID-induced upper gastrointestinal bleeding [UGIB]) instead of being irrational avoided or withdrawn. This is because the clinical benefit likely outweighs the possible side effects.

Nevertheless, the lowest effective dose of PPIs should be used with a finite period if possible, particularly for dyspepsia and non-erosive GERD. A step-down approach from high-dose PPIs to low-dose PPIs and even less potent acid suppressants (e.g. H2RAs) should be attempted. That being said, long-term PPI usage is...
necessary for a certain group of patients, including those with a high risk of NSAID-induced UGIB and Barrett’s oesophagus. H. pylori should be tested and treated if present among all long-term PPI users so as to prevent corpus atrophy.

CONCLUSION

Although there is increasing evidence from observational studies associating GC and long-term PPI use, causality remains undetermined due to residual and unmeasured confounders. Even if present, PPI-associated GC risk is likely to be of a concern only among those with pre-existing gastric precancerous lesions and current/prior H. pylori infection. Indications of PPIs should be reviewed with an individual’s risk-benefit profile being taken into consideration.

References

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Update in Oesophageal Motility Studies

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Department of Medicine and Therapeutics, The Chinese University of Hong Kong

INTRODUCTION

High resolution manometry (HRM) stands as the centrepiece in managing oesophageal motility disorders. HRM is one of the few selected examples in which international guidelines are based on a single investigation. The first edition, known as the Chicago classification, was published in 2009 and has been in its 3.0 version (CCv3.0) since 2015. The incorporation of Clouse plot and the introduction of the hierarchical approach to diagnosis have led to an easier understanding of the test and thus a plethora of interest and use. However, there are instances in which HRM delivers results of inconclusive significance, such as in Esophagogastric junction (EGJ) outflow obstruction (EGJOO). EGJOO accounts for up to 10% of all manometric diagnosis, but about one-third of them may be clinically irrelevant. Nevertheless, this diagnostic term causes much anxiety and may lead to unnecessary interventions. Moreover, the way the test is done also varies across different centres, partly due to the availability of devices (water perfused system or solid-state catheter system). Against this background, an international HRM Working Group consisting of 52 oesophageal motility experts selected by six international motility societies representing 20 countries, was formed. Following two years of work examining the latest available studies and evidence and a series of meetings, the working group came up with the latest Chicago Classification version 4.0 (CCv4.0), which was recently published in the April issue of Neurogastroenterology and Motility. This article aims to provide a brief summary highlighting the key changes in the CCv4.0, and summarising the updates on oesophageal motility studies.

CHICAGO 4.0 CLASSIFICATION

While the basic principles of the HRM test remain with the same set of equipment required, there are notable differences proposed by the CCv4.0. First of all, there is more clarity on how the test should be done. The test is preferably performed with a solid-state catheter with the same set of equipment required, there are notable differences proposed by the CCv4.0. First of all, there is more clarity on how the test should be done. The test is preferably performed with a solid-state catheter with a proposed algorithm to start with ten wet swallows in the supine position followed by multiple rapid swallows (MRS). Then the patient would change to the erect position for five more wet swallows before concluding the test with a free drinking challenge (FDC). The revised guideline allows the clinician to start in either the erect or supine position as the primary position and proceed depending on the clinical resources, time and the test finding. This may be particularly relevant in conditions such as EGJOO, as some patients with high lower oesophageal sphincter (LES) relaxation pressure can be normalised when the test is performed in the supine position. Provocation tests are also formally included as part of the protocol, with the MRS and FDC being recommended to be performed routinely. Other supportive tests such as pharmacological provocation, solid test swallow and solid test meals are included as optional, with the protocol and expected response standardised. Provocative maneuvers are usually intended to elicit LES relaxation or to look for oesophageal peristaltic reserve. They could be of value when HRM result is discordant with the symptom or other test results.

Concerning the diagnosis of motility disorders, there has been a major revamp of the approach to EGJ outflow obstruction. Manometrically, the median integrated relaxation pressure (IRP) must be elevated in both primary and secondary test positions. Crucially, it is recommended that patients should have relevant symptoms (dysphagia or atypical chest pain) in order to consider the IRP to be clinically significant. Moreover, complementary tests are suggested with timed barium tablet swallow and/or functional lumen imaging probe (FLIP). It is hoped that the more stringent criteria can help to select patients that would validate further investigations or intervention. Depending on the feature of peristaltic function, EGJOO can be subclassified into EGJOO with spastic features (presence of ≥ 20% premature swallows), EGJOO with hypercontractile features, EGJOO with ineffective motility, or EGJOO with no evidence of disordered peristalsis, although this subclassification is not mandatory. The requirement of relevant clinical symptoms is not only limited to EGJOO, but also included in the diagnosis of conditions including distal oesophageal spasm and hypercontractile oesophagus.

The CCv4.0 also incorporates changes in the manometric diagnosis of other oesophageal disorders. Jackhammer oesophagus in CCv3.0 has been put under the umbrella of the hypercontractile oesophagus, which includes other proposed subclasses, including single peak hypercontractile swallow and hypercontractile with LES after-contraction. On the other hand, fragmented peristalsis has been incorporated into ineffective oesophageal motility, with a requirement of > 70% ineffective (including weak, failed or fragmented) swallows or >= 50% failed swallows.

While the hierarchical approach of analysing HRM remains unchanged, oesophageal motility disorders are no longer classified into major motility disorders and minor motility disorders. Rather, in accordance to the
part of the oesophagus (the oesophageal body or the OGJ) being dysfunctional, the disorders are now termed as disorders of EGJ outflow and disorders of peristalsis (Table 1).

Table 1: Chicago 4.0 classification of oesophageal motility disorders. It is important to know that the hierarchical approach to diagnosis remains unchanged, and hence the diagnosis of disorders of EGJ outflow takes precedent over disorders of peristalsis.

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<tr>
<th>Disorders of EGJ outflow</th>
<th>Disorders of peristalsis</th>
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<td>Type I Achalasia</td>
<td>Absent contractility</td>
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<tr>
<td>Type II Achalasia</td>
<td>Distal oesophageal spasm</td>
</tr>
<tr>
<td>Type III Achalasia</td>
<td>Hypercontractile oesophagus</td>
</tr>
<tr>
<td>EGJOO</td>
<td>Ineffective oesophageal motility</td>
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FUNCTIONAL LUMINAL IMAGING PROBE (FLIP) TECHNOLOGY

The functional luminal imaging probe (FLIP) examination is a new addition to the Chicago classification. FLIP is a barostat catheter with multiple sensors that fills up in a controlled volumetric fashion. Aided by a technique called impedance planimetry, the cross-sectional area (CSA) can be converted based on the pressure and volume detected in each sensor. The distensibility (stiffness) is the product of CSA divided by the intra-balloon pressure.8

The FLIP technology first presented itself commercially as the endolumenal functional lumen imaging probe (EndoFLIP™) in 2009. It was mainly used in highly specialised centres to measure the compliance of sphincters such as the LES and anal sphincter.9,10 In 2017, there was an upgrade of the technology to EndoFLIP 2.0, where the data gathered through the FLIP probe could be displayed in the manner of a real time topography (Fig 1). EndoFLIP 2.0 allows detection of multiple new metrics such as the oesophageal secondary peristaltic response to the volumetric distension and thus significantly increases the value of the probe technology in motility testing. When used as an oesophageal motility test, the catheter is inserted intra-orally and the motility test is usually done in the same setting as when the patient undergoes OGD. In contrast to HRM, the patient is sedated and is not required to perform any active swallows. The FLIP catheter balloon, made of infinitely compliant plastic, carries no dilating potential, thus minimising the risk of trauma. The EndoFLIP received FDA approval in 2017 and has only been available outside America since late 2020. Due to the limited availability, most studies and data are from the EndoFLIP 1.0 system and confirmed the value of EndoFLIP in managing conditions including achalasia and GERD.11 From EndoFLIP 2.0 system, various metrics have been defined to show both the stiffness of the LES and the peristaltic function of the oesophagus through the secondary peristaltic response. Normative values are, however, based on a relatively small sample size and more data, especially from other ethnic groups, are in earnest need.

CONCLUSION

In summary, the Chicago 4.0 classification provides important changes that fill up the gaps noted in previous versions. There is more clarity on the protocol of both HRM and various supportive maneuvers while investigators are still allowed flexibility based on clinical need and circumstances. As there is no new equipment or software required for the HRM test, various centres can easily adopt the new classification. The demand for symptoms in making a diagnosis of some motility disorder does not weaken the importance of HRM, but rather empowers it to be more clinically relevant and the whole approach to oesophageal motility disorders coherent and sound. The FLIP technology emerges as a valuable supportive test in the arena of motility studies.
and its role will be better defined with more data and studies. As the update of previous classifications has always been a dynamic process, the CCv4.0 will undoubtedly spur more interest into conditions such as the long-term significance and development of ‘asymptomatic motility disorders’, and indeed cases where tests such HRM and FLIP test are not in agreement.

References

Radiology Quiz
Dr Carol PY CHIEN
MBBS, FRCR

Questions
1. What is the diagnosis?
2. What further investigations will you perform?
3. Question: What are the possible complications?

Case 1

(See P.36 for answers)
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INTRODUCTION

Colorectal cancer (CRC) is the commonest cancer in Hong Kong, with 5,634 newly diagnosed cases in 2018. It is also the second leading cause of cancer death in Hong Kong, accounting for 15.9% of cancer deaths in the same year.1 Of all the CRC, around 10-20% are familial cancers, while 80-90% are sporadic cases.2,3 Family members of CRC patients are at an increased risk of developing the disease, likely because of the shared genetic and environmental factors.4

FAMILY HISTORY OF COLORECTAL CANCER

Multiple meta-analyses and original studies have demonstrated that positive family history is associated with an increased risk of colorectal cancer.3,5-10 The magnitude of increased risk is affected by specifics of family history, including the age of cancer diagnosis of the index patient, the age of the individual at-risk, the degree of familial relationship with the index patient and the number of affected relatives.2,11-13

Family members of CRC patients are at a higher risk of developing CRC if the affected relative was diagnosed with the disease at a younger age.7,9,11,14 A large-scale study showed that the risk of first-degree relatives (FDR) of CRC patients developing the disease (compared to those without a family history) was in a continuum based on the age of CRC diagnosis of the index patient (Age < 40: hazard ratio (HR) 2.53; Age 40-49: HR 2.26; Age 50-59: HR 2.35; Age 60 - 69: HR 1.85; Age 70-79: HR 1.69; Age ≥ 80: HR 1.76).7

There is evidence that the effect of positive family history on the individual at-risk is higher when the person is younger and gradually declines as the person ages.5,7,11,14 A meta-analysis involving 9.28 million subjects showed that family history of CRC in FDR conferred a higher risk of developing CRC for those with a family history of villous adenoma and sessile serrated lesions in FDR. (Odds ratios (OR) 1.4, 95% CI, 1.20-1.63 and OR 1.27, 95% CI 1.03-1.57 respectively).21 Another study showed that family history of advanced adenoma (AA) (defined as adenoma ≥ 10 mm, high-grade dysplasia, villous or tubulovillous histology) in siblings was associated with a higher risk of advanced adenoma (OR 6.05, 95% CI, 2.74-13.36) and all colorectal neoplasia (OR 3.29, 95% CI, 2.16-5.03).22

FAMILY HISTORY OF COLONIC POLYPS

Studies showed that a family history of colonic polyps is also associated with a higher risk of having colorectal neoplasia. A large-scale study showed a higher risk of CRC for those who had a family history of villous adenoma and sessile serrated lesions in FDR. (Odds ratios (OR) 1.4, 95% CI, 1.20-1.63 and OR 1.27, 95% CI 1.03-1.57 respectively).21

SCREENING RECOMMENDATIONS

Guideline recommendations from professional organisations have suggested that individuals with a positive family history should start CRC screening earlier +/- receive more frequent testing because of their increased risk (Table 1).21-13
## Keep patients' lives Uneventful

**Stelara® has been demonstrated to achieve sustained remission in both:**

<table>
<thead>
<tr>
<th>Crohn's disease</th>
<th>Ulcerative colitis</th>
<th>Steroid-free remission:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical remission:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM-UNITI LTE study* at week 52 (5 years),</td>
<td>UNIFI LTE study* at week 92 (2 years),</td>
<td></td>
</tr>
<tr>
<td><strong>76.3%</strong> &amp; that on 90mg q12w is:</td>
<td><strong>90.4%</strong> &amp; that in the q12w group is:</td>
<td></td>
</tr>
<tr>
<td><strong>61.3%</strong></td>
<td><strong>89.5%</strong></td>
<td></td>
</tr>
<tr>
<td>Among the clinically remitted patients, the percentage of those who are steroid-free in the q12w group is:</td>
<td><strong>93.3%</strong> &amp; that in the q12w group is:</td>
<td></td>
</tr>
<tr>
<td><strong>97.3%</strong></td>
<td><strong>95.2%</strong></td>
<td></td>
</tr>
</tbody>
</table>

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### Abbreviations

- Dose-based administration: Abbreviation for long-term efficacy, safety, and immunogenicity of subcutaneous Stelara® maintenance therapy (50mg q4w or q12w) in patients with Crohn's disease who had received intravenous Stelara® induction therapy. Patients completing safety and efficacy evaluations at week 56 of the IM-UNITI maintenance study were eligible to participate in the LTE and continue the treatment they were receiving. Of the randomized patients who entered the LTE, 181 received Stelara® 50mg q12w and 138 received Stelara® 50mg q4w. Safety and efficacy findings in the LTE were based on the final results of IM-UNITI through 5 years. The clinical remission results are according to the modified observed-case analysis, whereas the steroid-free remission results are according to the non-missing imputation analysis.

- The UNIFI LTE is an ongoing study that evaluates the long-term efficacy and safety in patients with Crohn’s disease who had received subcutaneous Stelara® induction therapy. Patients completing safety and efficacy evaluations at week 56 of the IM-UNITI maintenance study were eligible to participate in the LTE and continue the treatment they were receiving. Of the randomized patients who entered the LTE, 181 received Stelara® 50mg q12w and 138 received Stelara® 50mg q4w. Safety and efficacy findings in the LTE were based on the final results of IM-UNITI through 5 years. The clinical remission results are according to the modified observed-case analysis, whereas the steroid-free remission results are according to the non-missing imputation analysis.

### References

1. Sandborn WJ et al. (The Gastroenterologist). 2011. in press. 2. Panaccione R et al. Aliment Pharmacol Ther. 2000;5(6):1205-1214. 3. STELARA® 50 mg solution for injection in pre-filled syringes for subcutaneous injection in adults for moderate to severe plaque psoriasis in adults who failed to respond to, or who have a contraindication to, or are intolerant to other systemic therapies including ciclosporin, MTX or PPA. 4. Paulus W. Arthritis. STELARA, alone or in combination with MTX, for the treatment of active psoriatic arthritis in adult patients with the response to treatments of the biologic or other systemic therapies including ciclosporin, MTX or PPA. 5. Paulus W. Arthritis. STELARA, alone or in combination with MTX, for the treatment of active psoriatic arthritis in adult patients. 6. Paulus W. Arthritis. STELARA, alone or in combination with MTX, for the treatment of active psoriatic arthritis in adult patients. 7. Paulus W. Arthritis. STELARA, alone or in combination with MTX, for the treatment of active psoriatic arthritis in adult patients.
It is recommended that persons with a family history of CRC in FDR start screening at age 40 or 10 years prior to the earliest CRC diagnosed in the family. The reason to start screening earlier for individuals with a family history is that they tend to have early-onset disease. Fuchs CS et al. showed that the age-specific cumulative incidence of CRC for persons with family history in FDR at around 35-40 years of age was similar to that for average-risk people at 50 years of age.14

Multiple professional organisations suggested that for individuals with a family history of CRC in FDR, the screening interval should be five years. Studies showed that positive family history in FDR is associated with metachronous colorectal adenoma after polypectomy.23,24 A large-scale study with a long follow-up period showed that the protective effect of colonoscopy for individuals without family history lasts beyond five years (multivariato HR for CRC 0.43, 95% CI, 0.32-0.58) but the protective effect was no longer observed beyond five years after colonoscopy for individuals with family history (multivariato HR for CRC 0.91, 95% CI, 0.55-1.52).25 Another study showed that for patients with a family history of CRC and a history of normal colonoscopy five years earlier, 8% and 33% of patients were found to have advanced adenomas and adenomas, respectively, on surveillance colonoscopy.26 These findings support that persons with a family history of CRC in FDR should receive more frequent screening than average-risk persons.

Colonoscopy is the preferred screening test for patients with a family history of CRC in FDR because it offers the highest sensitivity for CRC and colonic polyps.2,11,13 Faecal immunochemical test (FIT) is considered the alternative option if the patient refuses colonoscopy. A meta-analysis evaluating the use of FIT in patients at increased risk of CRC (include patients with a family history or personal history of CRC) showed that FIT had overall high diagnostic accuracy for CRC (sensitivity 93%, specificity 91%) and moderate diagnostic accuracy for advanced adenoma (sensitivity 48%, specificity 93%).27

Enhanced screening is also recommended for individuals with a family history of AA or advanced serrated lesions (sessile serrated lesion ≥ 1cm, sessile serrated lesion with dysplasia and traditional serrated adenoma) in FDR, given the increased risk of colorectal neoplasia associated with such family history.21,22 In practice, however, family history of advanced polyps (which include both AA and advanced serrated polyps) may be difficult to ascertain since patients may not know the details of their relative’s colonic polyp. Therefore, the recommendation of enhanced screening only applies to those with a family history of “documented advanced polyp”. If the details of FDR’s colonic polyps are not known, they should be considered “non-advanced polyp”.

The risk of CRC amongst individuals with a family history in only SDR is only marginally increased.12 Current guidelines do not recommend enhanced screening for family members who have CRC in only SDR.

**ASSESSING CRC RISK DUE TO FAMILY HISTORY**

We should assess each component of the patient’s family history, including the number of relatives with CRC (and/or advanced polyps), familial relationship with the affected relatives and relative’s age of CRC diagnosis. With this information, we can assess the degree of increased risk of CRC due to family history for the patient and provide appropriate CRC screening recommendations.

For families with a strong history of malignancy, including multiple members diagnosed with CRC (or other cancers, e.g. endometrial cancer), early-onset CRC,

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Family history</th>
<th>Recommendation</th>
</tr>
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<tbody>
<tr>
<td>CHP Cancer Expert Working Group 20172</td>
<td>≥ 1 FDR with CRC at ≤ 60y or ≥ 2 FDR with CRC at any age</td>
<td>Start CLN at 40y or 10y before the earliest CRC (but not earlier than 12y), repeat every 5y</td>
</tr>
<tr>
<td>American College Gastroenterology 202111</td>
<td>1 FDR with CRC (or AP) at &lt; 60y or ≥ 2 FDR with CRC (or AP) at any age</td>
<td>Start CLN at 40y or 10y before the earliest CRC (whichever is earlier), repeat every 5y</td>
</tr>
<tr>
<td>National Comprehensive Cancer Network 202111</td>
<td>1 FDR with CRC (or AP) at ≥ 60y</td>
<td>Start CLN at 40y or 10y before the earliest CRC (whichever is earlier), repeat every 5y</td>
</tr>
<tr>
<td></td>
<td>≥ 1 FDR with CRC at any age</td>
<td>Screen as average risk</td>
</tr>
<tr>
<td>Canadian Association of Gastroenterology Banff Consensus 201812</td>
<td>≥ 2 FDR with CRC</td>
<td>Start CLN at 40y or 10y before the earliest CRC (whichever is earlier), repeat every 5y</td>
</tr>
<tr>
<td></td>
<td>1 FDR with CRC</td>
<td>Start CLN at 40y or 10y before the earliest CRC (whichever is earlier), repeat every 5y</td>
</tr>
<tr>
<td></td>
<td>≥ 1 FDR with AA</td>
<td>CLN is the preferred test, FIT as second-line option</td>
</tr>
<tr>
<td></td>
<td>≥ 1 SDR with CRC</td>
<td>Start screening 40-50y or 10y before diagnosis of CRC in FDR (whichever is earlier), repeat CLN 5-10y</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Start screening (with either CLN or FIT) at 40-50y or 10y before the earliest AA (whichever is earlier), repeat CLN 5-10y or repeat FIT 1-2y</td>
</tr>
</tbody>
</table>

AA: advanced adenoma; AP: advanced polyp; CHP, Centre for Health Protection; CLN: colonoscopy; CRC: colorectal cancer; FDR: first-degree relatives; FIT: faecal immunochemical test; SDR: second-degree relatives; TDR: third-degree relatives

Advanced polyp (AP) includes advanced adenoma (≥ 1cm, high grade dysplasia, villous or tubulovillous histology) and advanced serrated polyp (≥1cm, any dysplasia, traditional serrated adenoma)
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- Abdominal fullness, meteorism
- Digestion deficiency in elderly, during convalescence and after operations
- GI disorder following drug intolerance
- After heavy meals, problems with mastication during dietary regimens

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- Amylase . . . 170 FIP-U

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- Protease . . . 420 Ph. Eur.-U.
- Amylase . . . 7000 Ph. Eur.-U.

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Efficacy rate for ameliorating various dyspeptic symptoms¹

<table>
<thead>
<tr>
<th>Condition</th>
<th>Combizym</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anepithymia</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Abdominal Distension</td>
<td>*</td>
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<tr>
<td>Belching</td>
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<tr>
<td>Diarrhea</td>
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<tr>
<td>Abdominal Pain</td>
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</tr>
<tr>
<td>Epigastric Burning</td>
<td>*</td>
<td></td>
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<tr>
<td>Constipation</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>


¹ Reference:
and the occurrence of CRC and multiple other cancers in a single individual, hereditary CRC syndrome (e.g. Lynch syndrome, familial adenomatous polyposis) should be suspected. These families should be referred for genetic counselling and testing. If the diagnosis of hereditary colorectal cancer syndrome is confirmed, affected individuals should receive enhanced screening based on their underlying diagnosis.\textsuperscript{2,11,16}

CONCLUSION

Individuals with a family history of CRC are at increased risk of developing the disease. In order to reduce the incidence and mortality of CRC, enhanced screening is recommended for them, and the screening schedule can be tailored based on the specifics of their family history.

References

ALT = alanine transaminase
TDF = tenofovir disoproxil fumarate
TAF = tenofovir alafenamide


Presentation: Tablets. 25 mg of tenofovir alafenamide - yellow, round, film-coated tablets, debossed with "GSI" on one side of the tablet and "25" on the other side.
Indications: VEMLidy is indicated for the treatment of chronic hepatitis B virus (HBV) infection in adults with compensated liver disease.
Dosage: Prior to initiation of VEMLidy, patients should be tested for HIV-1 infection; VEMLidy alone should not be used in patients with HIV infection. Adults: The recommended dosage is 25 mg of tenofovir alafenamide once daily. Patients with End Stage Renal Disease (ESRD): Estimated creatinine clearance below 15 mL/min who are not receiving chronic hemodialysis. Patients with Hepatic Impairment: No dosage adjustment is required in patients with mild hepatic impairment (Child-Pugh A).
Contraindications: None.
Warnings and Precautions: Severe acute exacerbation of Hepatitis B after discontinuation of treatment: Discontinuation of VEMLidy, may result in severe acute exacerbation of HBV. If appropriate, resumption of anti-HBV therapy may be warranted. Treatment may be initiated in patients who have been previously treated with anti-HBV therapy. If the patient is being treated with other antiviral agents, it is recommended that these agents be discontinued before initiating therapy with VEMLidy. If the patient is being treated with other antiviral agents, it is recommended that these agents be discontinued before initiating therapy with VEMLidy.

Before prescribing, please consult full prescribing information which is available upon request.

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Recommended dosage is 25 mg (one tablet) taken orally once daily with food. Patients with Renal Impairment: No dosage adjustment is required in patients with estimated glomerular filtration rate (GFR) >30 mL/min. For patients with GFR ≤30 mL/min, administer VEMLDY after completion of hemodialysis treatment. VEMLDY is not recommended in patients with Child-Pugh A. Not recommended in patients with decompensated (Child-Pugh B or C) hepatic impairment.

Nasopharyngitis and upper respiratory tract infections were the most common adverse events. No drug interactions have been observed. Discontinue VEMLDY in patients with chronic kidney disease, also assess serum phosphorus. In patients with chronic kidney disease, also assess serum phosphorus.

Abbreviations of hepatitis B. Patients who discontinue VEMLDY should be closely monitored with both clinical and laboratory follow-up for at least several months after stopping treatment. Due to the risk of development of HIV-1 resistance, VEMLDY alone is not recommended for the treatment of HIV-1 infection. The safety and efficacy have not been established in children weighing less than 30 kg.

Three cases of lactic acidosis orpronounced hepatotoxicity (which may include hepatomegaly with steatosis, headache, abdominal pain, cough, back pain, fatigue, nausea, arthralgia, diarrhea and dyspepsia were reported in >5% of subjects in clinical studies. 

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MCHK CME Programme Self-assessment Questions

Questions 1-10: Please answer T (true) or F (false)

1. Of all the colorectal cancer (CRC), around 40% are familial cancers.
2. Family members of colorectal cancer patients are at a higher risk of developing cancer if the affected relative was diagnosed with the disease at a younger age.
3. Colorectal cancer risk is higher if the individual at-risk and the affected index patient have a closer familial relation.
4. The colorectal cancer risk of an individual increases with the number of relatives affected.
5. People with a family history of colorectal cancer (CRC) in first degree relatives should start screening five years prior to the earliest CRC diagnosed in the family.
6. For individuals with a family history of colorectal cancer in first degree relatives, the screening interval should be ten years.
7. Colonoscopy is the preferred screening test for patients with a family history of colorectal cancer in first degree relatives.
8. Enhanced screening is recommended for individuals with a family history of advanced adenoma even though there is no colorectal cancer.
9. Enhanced screening is recommended for family members who have colorectal cancer in only second-degree relatives.
10. For families with multiple members diagnosed with colorectal cancer (CRC), early-onset CRC, and the occurrence of CRC and multiple other cancers in a single individual, they should be referred for genetic counselling and testing.

ANSWER SHEET FOR AUGUST 2021

Please return the completed answer sheet to the Federation Secretariat on or before 31 August 2021 for documentation. 1 CME point will be awarded for answering the MCHK CME programme (for non-specialists) self-assessment questions.

Colorectal Cancer Screening for Individuals with Family History

Dr Frank Yuk-fai LAM
MBBS (HK), MRCP (UK), FHKCP, FHKAM (Medicine)
Specialist in Gastroenterology and Hepatology
Clinical Assistant Professor, Department of Medicine and the HKU Endoscopy Centre, The University of Hong Kong

1 2 3 4 5 6 7 8 9 10

Name (block letters): ____________________________ HKMA No.: ____________ CDSHK No.: ____________
HKID No.: __ __ - __ __ __ __ X X (X) HKDU No.: ____________ HKAM No.: ____________
Contact Tel No.: ____________________________ MCHK No. / DCHK No.: ____________________________ (must fill in)

Answers to July 2021 Issue

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Hi, John

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I am feeling Fine!

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Microbiota and Colorectal Cancer

Dr Sunny H WONG
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Associate Professor
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Institute of Digestive Disease, State Key Laboratory of Digestive Diseases, Li Ka Shing Institute of Health Sciences,
The Chinese University of Hong Kong

INTRODUCTION

Colorectal cancer (CRC) is a prevalent cancer, accounting for about 10% of all new cases worldwide. Due to its proximity to the colorectal epithelium, the intestinal microbiota plays an increasingly important role in CRC. Recent studies have identified the role of several bacteria in the development of CRC. These findings provide new opportunities for using these microorganisms for clinical applications, such as detecting them as diagnostic or prognostic biomarkers. With new evidence suggesting that the gut microbiome plays a role in cancer treatment, its modulation has the potential to shrink tumours, enhance treatment, reduce treatment side effects and prevent cancer recurrence. The purpose of this article is to review the recent advances in the occurrence of microbial CRC and the translational potential of these findings.

GUT MICROBIOTA IN CRC

CRC is one of the most common cancers and presents a major burden on global health. Like many common diseases, cancer formation in the large intestine is multifactorial and is caused by various genetic and environmental factors. However, twin and family studies estimate that the heritability of CRC is only 12-35%, reflecting the importance of the environment as a major determinant of disease.

Among environmental factors, the role of intestinal microbiota in the development of CRC has received the most attention. There is early evidence from animal studies supporting the pathogenic role of microorganisms in CRC. In one experiment in which both germ-free and conventional mice were treated with carcinogens, 93% of the conventional mice and only 21% of the germ-free mice developed colon tumours. In addition, human studies using comparative metagenomic methods have shown that the CRC microbiota differs from that of healthy controls. In general, the CRC microbiota exhibits a different microbial structure, often referred to as ecological dysregulation, reflecting the different ecological environments of patients with CRC. While specific strains of Bacteroides fragilis, Escherichia coli, and Streptococcus gallolyticus have been linked to CRC, recent studies have found new associations with other bacteria. These bacteria include Fusobacterium nucleatum, a species not previously associated with cancer, as well as Parvimonas, Peptostreptococcus, Porphyromonas and Prevotella. They were found to be more abundant in patients with CRC. Some of these bacteria are closely associated with inflammation, immune regulation and biofilm formation - pathologic processes that are closely associated with cancer formation. Understanding these mechanisms may provide insights into their modulation for therapeutic purposes.

GUT MICROBIOTA AS BIOMARKERS FOR SCREENING CRC

An emerging application of the gut microbiota discovery is on biomarkers. A biomarker is an indicator of the presence or severity of a disease. Given the global health burden of CRC, there is an urgent need for an accurate, affordable and non-invasive CRC test, especially for early neoplasia, which can be treated with excellent clinical outcomes. For example, the 5-year survival rate for Stage I CRC is as high as 90%, compared with approximately 10% for Stage IV metastatic disease. Current stool-based occult blood tests have limited sensitivity in the detection of CRC and advanced adenoma. Although the multi-target faecal DNA test may detect more cancers than the faecal immunochemical test (FIT), the sensitivity of the latter to detect advanced adenomas is still not ideal.

In this regard, some studies have made use of the abundance of bacterial species to distinguish patients with CRC from healthy individuals. Two case-control studies used > 20 microbial biomarkers, giving an area under the receiver operating characteristic (AUROC) curve of 0.84-0.87. In a metagenomic study comparing patients with CRC with healthy individuals in Hong Kong, a panel of 20 microbial genes were identified to be associated with disease status. This set of microbial markers can be trimmed into two information-rich biomarkers, quantifiable by polymerase chain reaction (PCR), to achieve an AU of 0.84. Among different candidate bacteria, F nucleatum appeared as a key marker either when tested alone or with other bacteria. The faecal abundance of F nucleatum can enhance the detection of CRC by FIT, with superior sensitivity and specificity. For example, the addition of faecal F nucleatum has been shown to increase the AUC of FIT from 0.85 to 0.95. This finding illustrates the advantage of multi-target testing, in which individual components can complement each other to enhance test performance. The best test may come from a panel balancing the number of markers, the diagnostic performance, the logical feasibility and simplicity of analysis.

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Qinlock may cause reversible or irreversible heart failure. Qinlock should be used only in patients for whom alternative treatment options are not viable or have been determined to be inappropriate.

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The most common adverse reactions (≥20% of patients) were grade 1-2 hypertension, fatigue, nausea, anorexia, pyrexia, vomiting, dyspnea, constipation, and dyspepsia.

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through progressive evolution from normal mucosa to a precursor lesion and finally a malignant tumour. An adenoma is the primary precursor lesion of CRC, and once identified, it can be removed by colonoscopic resection. Therefore, there is a need to detect adenomatous polyps, especially advanced neoplasms, in the screening tests apart from detecting early CRC. In this regard, people have studied the use of microbial markers to detect colorectal adenoma. Combining five bacterial abundance data and clinical parameters, faecal microbial markers have been shown to distinguish adenomas from the control group with an AUC of 0.97. A subsequent study has also identified a *Lachnoclostridium* marker for diagnosing colorectal adenoma. Although the difference from healthy control was less distinctive, this finding showed that a non-invasive biomarker for this cancer precursor is possible.

**GUT MICROBIOTA FOR CRC THERAPEUTIC MODULATION**

In addition to its pathogenic role in tumour formation, there is evidence that the intestinal microbiota can affect the efficacy and side effects of oncological therapies. The microbiota can be used to predict treatment responses and adverse reactions, and its modulation could potentially facilitate cancer treatment and improve patient outcomes. Some of these studies provide insights into managing patients in novel and personalised ways.

Data from studies suggest that the efficacy of some chemotherapeutic agents, including cyclophosphamide and oxaplatin, can be affected by the gut microbiota. The chemotherapeutic drug 5-fluorouracil has been shown to induce its cytotoxic effects through bacterial ribonucleotide metabolism. Apart from chemotherapy, there is considerable interest in manipulating the microbiota to improve immunotherapy. Immunotherapy is an effective treatment for many cancers. The gut microbiota is required for mounting an effective immune response following administration of checkpoint inhibitors, including those targeting the programmed cell death protein 1 (PD-1) axis. Specific bacteria were positively correlated with immunotherapy response, including Akkermansia muciniphila, Bifidobacterium, and Faecalibacterium. In addition, the intestinal microbiota may modulate the side effects of immunotherapy as certain bacteria have been found to be associated with susceptibility to immunotherapy-induced colitis. Faecal microbiota transplantation (FMT) has been used to treat patients with refractory immunotherapy-associated colitis.

**CONCLUSION**

Over the past decade, extensive research has identified the microbiota as important in cancer formation, particularly in CRC, where the cancer growths are closely located to the microbiota. The important role of microbiota in the development of CRC presents unprecedented opportunities, though not without challenges, for new applications of CRC diagnosis and management. Some challenges include the validation of biomarkers in different populations to determine the best marker combination, as well as developing effective microbial products as part of cancer treatment. Regardless, valuable microbiota studies have expanded our understanding of cancer formation and provided new opportunities for developing novel diagnosis and treatment applications. With exciting developments in this rapidly growing field, the microbiota will become an important part of cancer prevention and treatment in the future.

**References**

LINZESS®: A Concrete Breakthrough for IBS Constipation

The 1st and only FDA-approved GC-C agonist for IBS-C in Hong Kong¹²

Significant Abdominal Pain Score Improvements
- ≥ 30% weekly mean decrease in abdominal pain or discomfort, with neither weekly score worsening from baseline, for ≥ 6 / 12 weeks (% responders)¹

<table>
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<tr>
<th>Placebo</th>
<th>Linzess¹⁰</th>
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<td>48.8%</td>
<td>60.0%</td>
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</table>

Recommended dosing for IBS-C in adults:
- 290 mcg one-capsule once-daily⁵
- Take on empty stomach ≥ 30 min before first meal⁷

Significant CSBM & SBM Improvements
- % Patients with CSBM 24 hr after 1st dose³

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<thead>
<tr>
<th>Placebo</th>
<th>Linzess¹⁰</th>
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<td>6.4%</td>
<td>17.0%</td>
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</table>

International Guideline Recommendations:

World Gastroenterology Organisation
2015 Global Guidelines⁶
- Linaclootide is safe and effective for IBS-C treatment

American Gastroenterological Association
2014 Institute Guideline⁷
- Strong recommendation
- High-quality evidence

Canadian Association of Gastroenterology
2019 Practice Guidelines⁸
- Strong recommendation
- High-quality evidence

Abbreviations: CSBM = complete spontaneous bowel movement; GC-C = guanylate cyclase-C; IBS-C = irritable bowel syndrome with constipation; SBM = spontaneous bowel movement.

References:

Abbreviated Prescribing Information (version APRHK LIN 0118):
Presentation: 290 micrograms linaclootide capsule.
Indications: Symptomatic treatment of moderate to severe irritable bowel syndrome with constipation (IBS-C) in adults.
Dosage: 290 micrograms once daily. Taken at least 30 minutes before a meal.
Contraindications:
- Hypersensitivity to linaclootide or excipients.
- Known or suspected mechanical gastrointestinal obstruction.
- Pregnancy and breastfeeding.
- Interactions: None since it acts on the enteric nerve and not the central nervous system.

Uncommon adverse reactions (2%): included: abdominal pain, abdominal distension, diarrhea, flatulence, watery stools, and headache. No other common adverse reactions (≤5%) were abdominal pain, abdominal distension, flatulence, watery stools, and headache. No other common adverse reactions (≤5%) were abdominal pain, abdominal distension, flatulence, watery stools, and headache.

Please contact (852) 2420-7388 or HKPlaintiffSafety@astra-zeneca.com for adverse drug reactions (ADRs) reporting to AZHK.

Linzess® is a registered trademark of Ironwood Pharmaceuticals, Inc. and used with permission.

AstraZeneca Hong Kong Limited
Unit 1-3, 11/F, 18 King Wah Road
North Point, Hong Kong
Tel: (852) 2420 7288
Fax: (852) 2422 6788

Ironwood (linaclootide) capsules 令澤舒®
**Powerful Acid Control**
**Proven Clinical Benefits for GERD**

**High 8-Week Healing Rate**

89.1% – 95.5%³⁻⁹
(And 82.4% in a study¹⁰ that recruited only Los Angeles grade C or D patients).

**4% Absolute Increase in Healing Rate**

vs. lansoprazole 30 mg, omeprazole 20 mg, and pantoprazole 40 mg.¹¹

**Effective Symptom Relief**

In patients with persistent GERD symptoms after PPI treatment, *¹²
8 weeks of Nexium™ 40 mg delivered:¹²
- **Heartburn Frequency:** -3.4 days / wk
- **Acid Regurgitation:** -2.6 days / wk
- **Epigastric Pain:** -3.6 days / wk

* p < 0.0001

³⁻⁹

**Sustained Acid Control**

**↑ 3.1 – 6.3 Hrs of Intragastric pH > 4**

Nexium™ 40 mg vs. lansoprazole 30 mg, omeprazole 20 mg, rabeprazole 20 mg (all p < 0.0001), and pantoprazole 40 mg (p < 0.0001) at steady state.²

**Effective H. Pylori Eradication**

** Demonstrated high eradication rates in two Hong Kong studies of standard triple therapy:**

84.6% – 92.7%¹³⁻¹⁴

**Dosing**

**For GERD**
- Treatment of Erosive Reflux Esophagitis: 40 mg once daily for 4 weeks.*
- Long-term Management of Patients with Healed Esophagitis to Prevent Relapse: 20 mg once daily.
- Symptomatic Treatment of GERD: 20 mg once daily in patients without esophagitis.¹⁻³,¹⁻⁴

* An additional 4 weeks treatment is recommended for patients with healed esophagitis or persistent symptoms.

¹⁻³

**For H. Pylori Eradication**
- 7-Day BID Triple Therapy: 20 mg Nexium™ + 1 g Amoxicillin + 500 mg Clarithromycin

**Abbreviations:** BID = twice daily, GERD = gastroesophageal reflux disease, H. pylori = Helicobacter pylori, PPI = proton pump inhibitor.

References:

**MUPS Technology**

(Multiple Unit Pellet System) for Flexible Administration

Tablet can be dispensed in non-carbonated water and administered through a gastric tube.³

³

**AstraZeneca Hong Kong Limited**

Unit 1-3, 11/F, 18 King Wah Road, North Point, Hong Kong

Tel: (852) 2420 7388 Fax: (852) 2422 6788

Please contact HKPatientSafety@astrazeneca.com for adverse drug reactions (ADR) reporting to AZ/HEX. Nexium™ is a registered trademark of the AstraZeneca group of companies.
Artificial Intelligence-assisted Gastrointestinal Endoscopy

Dr Thomas KL LUI
MBBS, MMedSc, FHKAM
Specialist in Gastroenterology and Hepatology
Associate Consultant, Department of Medicine, Queen Mary Hospital, Hong Kong

INTRODUCTION
Artificial intelligence (AI) has been increasingly applied in clinical medicine over the past decade. For instance, AI-assisted predictive models can be used in the diagnosis of disease, treatment guidance as well as prognosis estimation. The advances in computation power and deep learning algorithms enabled highly accurate image classification, which have led to applications in areas such as facial recognition, autopilot, augmented reality, customer behaviour prediction, and medical imaging. Since gastrointestinal endoscopy is highly dependent on real-time interpretation of images, it has become a perfect target for this rapidly advancing technology.

AI-ASSISTED OGD
One of the main purposes of oesophagogastroduodenoscopy (OGD) is the detection of neoplastic lesions, including pre-cancerous dysplastic lesions, in the upper aerodigestive tract. However, unlike advanced cancer, dysplasia or early mucosal cancer is usually subtle and sometimes requires an expert endoscopist further aided by image-enhanced endoscopy (IEE) for detection. As deep learning model has sharpened the accuracy of image analysis, AI holds the great potential to fill in this gap, serving as an assistant of a non-expert endoscopist. Several preclinical studies have shown that a well-trained AI can differentiate the dysplastic area from normal mucosa in the stomach with > 90% accuracy. Luo et al. reported a prospective evaluation of an AI system on upper endoscopic images from 1,794 patients. The diagnostic accuracy in terms of the area under the receiver operating characteristics curve (AUC) for the diagnosis of gastric dysplastic lesions was 92.7%. A meta-analysis involving 23 studies of 969,318 endoscopic images on the application of AI in upper endoscopy demonstrated that the accuracy of AI in the detection of dysplastic lesions approached 90% not only in the stomach, but also in Barrett’s oesophagus and squamous oesophagus. In addition to the detection of these dysplastic lesions, the use of AI has also been shown to hasten the learning curve of junior endoscopists for endoscopic diagnosis of dysplastic lesions. The performance of junior endoscopists in the diagnosis of dysplastic lesions clearly demonstrated a significant improvement following their having received feedback from AI. Despite promising results from these early studies, most of these studies were retrospective in nature and in lack of proper control. The only randomised controlled trial (RCT) in AI-assisted OGD by Wu et al. demonstrated AI could improve the blind spots of the endoscopist at the expense of longer inspection time. They reported that all mucosal cancer and high-grade dysplasia were identified by their AI system.

AI-ASSISTED COLONOSCOPY
Similarly, detection and removal of polyps in the colon via colonoscopy have been the cornerstone for prevention of colorectal cancer. A number of retrospective studies demonstrated that AI had very high accuracy (> 90%) in the detection of polyps. A recent meta-analysis summarised the accuracy of AI in the detection of polyps to be > 95%. In fact, there were several RCTs showing that AI-assisted colonoscopy can improve the detection of adenomatous polyps. Wang et al. reported the first randomised trial of AI-assisted colonoscopy in 2019. Among a total of 1,130 patients randomised, the adenoma detection rate of the AI group was significantly higher than that of the conventional colonoscopy group (0.29 vs 0.20, p < 0.001); similar difference was observed between the two groups in the mean number of polyps per patient (0.95 vs 0.50, p < 0.001) and in the mean number of adenomas per patient (0.53 vs 0.31, P < 0.001). Repici et al. reported another RCT involving three centres in Italy. The AI system was found to provide a higher chance of adenoma detection than conventional colonoscopy, with an odds ratio (OR) of 1.30 (95% CI: 1.14 - 1.45). Furthermore, the AI performance was not affected by the size, shape nor location of the polyps. The pooled analysis of RCTs showed that the adenoma detection rate of the AI system approached double that of conventional colonoscopy, with pooled odds ratio of 1.91 (95% CI: 1.51-2.41). Another prospective trial also showed AI could significantly reduce missed adenomatous polyps in the colon by 26.9%. Most of the extra lesions detected by AI were small (< 5 mm), although some studies suggested some vague sessile lesions or advanced lesion missed by the endoscopists could also be picked up by AI.

Thanks to the advances in endoscopic techniques in the recent decade, many large dysplastic or mucosal cancerous lesions in the colon which used to be removed by surgical means can now be removed by endoscopic therapy. However, since only colonic lesions without submucosal deep invasion are suitable for endoscopic removal, the selection of suitable lesion(s) to be removed by an advanced endoscopic technique such as endoscopic submucosal dissection usually requires ample experience in image-enhanced endoscopy so as to interpret the endoscopic image of these large lesions.
colonic lesions. Since the deep learning model provides excellent image classification, there is great potential for AI to assist the endoscopist in selecting suitable lesions for endoscopic removal. Accuracies of up to 85-90% were demonstrated by previous studies on AI analysis of the endoscopic image to identify the suitability of these lesions for endoscopic therapy.11,12

Another important area of AI use in colonoscopy is the application of “remove and discard” strategy for colonic polyp and “diagnose and leave” strategy for diminutive polyp at rectosigmoid region.13 Traditionally, all colonic polyps removed were sent for histology assessment in order to determine the surveillance colonoscopy interval. Along with the improvement in endoscopic image quality, a trained endoscopist can possibly and accurately undertake endoscopic assessment of the pathology of a colonic polyp. The “remove and discard” or “diagnose and leave” approach is to replace histologic assessment with endoscopic assessment. The endoscopist would assess the pathology of a colonic polyp by endoscopic images and either remove the polyp without histology assessment or leave the hyperplastic polyp untouched at the rectosigmoid area. This approach is cost-effective since it can save the cost of pathology and provide immediate advice on surveillance duration based on the endoscopic assessment.14 The American Society for Gastrointestinal Endoscopy (ASGE) also accepts this approach provided that the polyp is less than or equal to 5 mm in size (diminutive polyp), and the endoscopist could prove that his/her histology assessment of polyps via endoscopy can achieve > 90% agreement with the histopathology results in terms of surveillance interval or with > 90% negative predictive value for the rectosigmoid diminutive polyp.13 Nevertheless, endoscopists might require further training in IEE in order to achieve these cut-off values.15 Again, AI can potentially fill in this gap. Chen et al. reported an accuracy of 90.1% for a deep learning model in distinguishing adenomatous from hyperplastic diminutive polyps.16 Byrne et al. also showed another deep learning model with an accuracy of 94.0% for a similar function on diminutive polyps.17 A meta-analysis inclusive of nine studies showed that the pooled accuracy of AI was greater than 95% for histology prediction of diminutive polyps.18 However, most of these trials were retrospective in nature. Mori et al. reported a prospective real-time trial involving 325 patients and showed that a special computer-aided endocytoscopy can achieve a 96.4% negative predictive value for histology prediction of rectosigmoid diminutive polyps; such excellent prediction readily meets the requirement for “diagnose and leave” approach.18

CURRENT REAL-LIFE APPLICATION OF AI-ASSISTED GASTROINTESTINAL ENDOSCOPY

Most of the current graphical user interface (GUI) of the AI system used in endoscopy uses a real-time on-screen indicator. The most established GUI would be the AI colonic polyp detection model. A localisation box would appear on the screen to indicate the presence of polyp (Fig. 1). The AI actually serves as an assistant to remind the endoscopist of the potential suspicious area on the screen. Since the current application of AI in gastrointestinal endoscopy is not a fully automatic procedure, the interpretation still relies on endoscopists. Despite the accuracy of the most of the well-designed AI models, false signals would still occur occasionally. False positive signals sometimes occur during the procedure such as suction artefact and wrinkled mucosa. However, these signals are usually transient and would disappear after further examination. Most of the current AI also suffers a limitation in that they analyse the “on-screen” images. However, about 20% of missed lesions are probably not shown “on-screen”, i.e. lesions may be hidden behind the colonic mucosal fold or underneath the debris. It has been shown in an earlier study that the quality of bowel preparation was found not to be associated with detection of missed adenomas by AI, suggesting that the current AI-assisted colonoscopy probably may not be able to reduce adenoma miss rate in patients with poor bowel preparation.19 The endoscopist should bear in mind this limitation of the current AI system.

Another important issue would be the procedure time. Although the AI system can improve the detection rate, the current system still requires the interpretation by the endoscopist. Extra procedure time is also required, as already reflected by some of the RCTs8,19, to remove the additional lesions, and to allow ongoing interaction between the AI and the endoscopist, such as the need to verify the presence of genuine polyp detected by the AI localisation system.

FUTURE PROSPECTS AND CONCLUSION

Although early data suggest that the application of AI could improve our endoscopy practice, the “black-box” nature of the AI models may be an important hurdle for the regulatory approval and wide implementation in clinical practice. Clinicians should follow this area closely and be aware of its potential impact on our practice.
References

Are your patients' sleep disturbed by a "Waking Volcano"?

62% of PPI-treated GERD patients have experienced breakthrough symptoms at night1
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<td><em>Certificate Course on Cytogenomics 2021 (Video Lectures)</em></td>
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<td><em>Live Lecture The New Diabetes Paradigm - Insight from Clinical to Real Life</em></td>
<td><em>Live Lecture Nutrition Intervention for Polymorbid Older Adults</em></td>
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<td><em>Certificate Course on Complaint Management 2021 (Video Lectures)</em></td>
<td><em>FMSHK Executive Committee Meeting</em></td>
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<td><em>Live Lecture Protection against gastroenteritis- Rotavirus vaccines</em></td>
<td><em>Certificate Course on Complaint Management 2021 (Video Lectures)</em></td>
<td><em>Live Lecture Current Management of Lung Cancer</em></td>
<td><em>Live Lecture The New Era for SGLT2i: A Tool for Heart Failure Treatment and Cardiorenal Protection</em></td>
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## Certificate Course on Renal Medicine 2021 (Video Lectures)

**Jointly organised by**
The Federation of Medical Societies of Hong Kong
Hong Kong Society of Nephrology

**Objectives:**
To update the participants on new advances in renal medicine and clinical practice of common renal problems, and to help the participants to interpret results of common renal investigations.

### Topics

<table>
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<tr>
<th>Date</th>
<th>Topics</th>
<th>Speakers</th>
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</table>
| 2 Sept 2021| Common Investigation Tests for Renal Disease Including Approach to Proteinuria and Haematuria | Dr. Sze-kit YUEN  
Associate Consultant  
Department of Medicine & Geriatrics  
Caritas Medical Centre |
|            | Update and Management of Acute Kidney Injury                           | Dr. Chun-hay TAM  
Clinical Associate Professor (Honorary)  
Department of Medicine & Therapeutics  
The Chinese University of Hong Kong  
Honorary Clinical Assistant Professor  
Department of Medicine, University of Hong Kong |
| 9 Sept 2021| ABC of Hemodialysis Therapy                                            | Dr. Gensy Mei-wa TONG  
Director  
Renal Care  
Hong Kong Baptist Hospital  
Nephrologist-in-charge  
Kai Tak Haemodialysis Center |
|            | Update and Management of Glomerular Disease                            | Dr. Elaine Tsz-ling HO  
Associate Consultant  
Department of Medicine  
Teung Kwun O Hospital |
| 16 Sept 2021| Nutritional Management in Kidney Diseases                             | Ms. Cherry Pui-yee LAW  
Dietitian  
Pamela Youle Nethersole Eastern Hospital |
|            | Kidney Involvement in Multi-System Disorders                           | Dr. Desmond Yat-hin YAP  
Clinical Associate Professor  
Department of Medicine  
University of Hong Kong |
| 23 Sept 2021| Drug Prescribing in Renal Failure                                      | Dr. Anthony Kai-ching HAU  
Associate Consultant  
Department of Medicine & Geriatrics  
Tuen Mun Hospital |
|            | ABC of Peritoneal Dialysis Therapy                                     | Dr. Joseph Ho-sing WONG  
Associate Consultant  
Department of Medicine  
Queen Elizabeth Hospital |
| 30 Sept 2021| Update on Diabetic Nephropathy                                         | Dr. Maggie Kam-man MA  
Associate Consultant  
Department of Medicine  
Queen Mary Hospital |
|            | Update and Management of Chronic Kidney Disease                        | Dr. Wing-fai PANG  
Associate Consultant  
Department of Medicine & Therapeutics  
Prince of Wales Hospital |
| 7 Oct 2021 | Update and Management of Hypertension                                  | Dr. Wai-yan LAU  
Associate Consultant  
Department of Medicine  
Alice Ho Miu Ling Nethersole Hospital |
|            | ABC of Renal Transplantation                                           | Dr. Ka-fai YIM  
Associate Consultant  
Department of Medicine & Geriatrics  
Princess Margaret Hospital |

**Date:** 2, 9, 16, 23, 30 September & 7 October, 2021 (Every Thursday)

**Duration of session:** 1.5 hours (6 sessions)

**Time:** 7:00 pm – 8:30 pm

**Course Feature:** Video lectures (with Q&A platform for participants to post the questions)

**Quiz for doctors:** To tie in with the CME requirements for video lectures, DOCTORS are required to complete a quiz after the completion of each lecture

**Language Media:** Cantonese (Supplemented with English)

**Course Fee:** HK$1,000

**Certificate:** Awarded to participants with a minimum attendance of 70% (4 out of 6 sessions)

**Deadline:** 25 August 2021

**Enquiry:** The Secretariat of The Federation of Medical Societies of Hong Kong  
Tel.: 2527 8898  
Fax.: 2865 0345  
Email: vienna.lam@fmshk.org

CME / CNE Accreditation in application

Online Application from website: http://www.fmshk.org
## Calendar of Events

<table>
<thead>
<tr>
<th>Date / Time</th>
<th>Function</th>
<th>Enquiry / Remarks</th>
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<tbody>
<tr>
<td><strong>2 MON</strong> 7:00 PM</td>
<td><strong>Certificate Course on Cytogenomics 2021 (Video Lectures)</strong> Recorder: The Federation of Medical Societies of Hong Kong Speaker: Dr Anita Sik-yan KAN</td>
<td>Ms Vienna LAM Tel: 2527 8988</td>
</tr>
<tr>
<td><strong>3 TUE 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> HKMA - HKS&amp;H CME Programme 2021 Topic: Glaucoma - Beyond intraocular pressure, the updates we should know Organiser: Hong Kong Medical Association &amp; Hong Kong Sanatorium &amp; Hospital Speaker: Dr BAiG Nafees Begum</td>
<td>HKMA CME Dept. Tel: 3108 2507 1 CME Point</td>
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<tr>
<td><strong>5 THU 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> The Role of Blood and Urine Biomarkers in Prostate Cancer Diagnosis Organiser: Hong Kong Medical Association Speaker: Dr Peter Ka-fung CHIU</td>
<td>HKMA CME Dept. Tel: 2527 8988 1 CME Point</td>
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<tr>
<td><strong>6 FRI 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> Post-ACS Treatment Organiser: HKMA-XTM Community Network Speaker: Dr Andrew Kei-yan NG</td>
<td>Ms Candice TONG Tel: 3108 2513 1 CME Point</td>
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<td><strong>9 MON 7:00 PM</strong></td>
<td><strong>Certificate Course on Cytogenomics 2021 (Video Lectures)</strong> Recorder: The Federation of Medical Societies of Hong Kong Speaker: Dr WONG Wai-shan</td>
<td>Ms Vienna LAM Tel: 2527 8988</td>
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<tr>
<td><strong>10 TUE 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> Post Stroke Dementia Organiser: HKMA-Shatin Community Network Speaker: Dr Ray Chan-chung CHAN</td>
<td>Ms Candice TONG Tel: 3108 2513 1 CME Point</td>
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<td><strong>10 TUE 7:00 PM</strong></td>
<td><strong>Certificate Course on Childhood Arthritis and Rheumatic Disease II (Video Lectures)</strong> Recorder: The Federation of Medical Societies of Hong Kong Speaker: Dr lettuce LEUNG</td>
<td>Ms Vienna LAM Tel: 2527 8988</td>
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<tr>
<td><strong>11 WED 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> Keys for Effective AR Management: Individualised Treatment &amp; Improved Patient Adherence Organiser: HKMA-Central, Western &amp; Southern Community Network Speaker: Dr Tang Chi-ho</td>
<td>Ms Antonia LEE Tel: 3108 2514 1 CME Point</td>
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<td><strong>12 THU 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> The New Diabetes Paradigm - Insight from Clinical to Real Life Organiser: HKMA-KLN East Community Network Speaker: Dr Enoch WU</td>
<td>Ms Antonia LEE Tel: 3108 2514 1 CME Point</td>
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<td><strong>13 FRI 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> Nutrition Intervention for Polymorbid Older Adults Organiser: HKMA-KLN City Community Network Speaker: Dr YIP Wai-man</td>
<td>Ms Candice TONG Tel: 3108 2513 1 CME Point</td>
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<td><strong>Certificate Course on Cytogenomics 2021 (Video Lectures)</strong> Recorder: The Federation of Medical Societies of Hong Kong Speaker: Dr Edmond Shiu-kwan MA</td>
<td>Ms Vienna LAM Tel: 2527 8988</td>
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<td><strong>17 TUE 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> HKMA-GHK CME Programme Topic: Treatment on Breast Cancer Organiser: Hong Kong Medical Association &amp; Glenaequl Hong Kong Hospital Speaker: Dr Roger Kai-cheong NG &amp; Dr Lorraine Chi-yan CHOW</td>
<td>HKMA CME Dept. Tel: 2527 8952 1 CME Point</td>
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<td><strong>17 TUE 7:00 PM</strong></td>
<td><strong>Certificate Course on Complaint Management 2021 (Video Lectures)</strong> Recorder: The Federation of Medical Societies of Hong Kong Speaker: Dr Ludwig TSOI</td>
<td>Ms Vienna LAM Tel: 2527 8988</td>
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<td><strong>19 THU 7:00 PM</strong></td>
<td><strong>FMSHK Executive Committee Meeting</strong> Organiser: The Federation of Medical Societies of Hong Kong; Venue: Council Chamber, 4/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong</td>
<td>Ms Nancy CHAN Tel: 2527 8988</td>
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<td><strong>FMSHK Council Meeting</strong> Organiser: The Federation of Medical Societies of Hong Kong; Venue: Council Chamber, 4/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong</td>
<td>Ms Nancy CHAN Tel: 2527 8988</td>
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<td><strong>23 MON 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> Protection against gastroenteritis- Rotavirus vaccines Organiser: Hong Kong Medical Association Speaker: Dr Robert LÀW</td>
<td>HKMA CME Dept. Tel: 3108 2507 1 CME Point</td>
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<td><strong>24 TUE 7:00 PM</strong></td>
<td><strong>Certificate Course on Complaint Management 2021 (Video Lectures)</strong> Recorder: The Federation of Medical Societies of Hong Kong Speaker: Dr Ludwig TSOI</td>
<td>Ms Vienna LAM Tel: 2527 8988</td>
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<td><strong>26 THU 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> Current Management of Lung Cancer Organiser: HKMA Hong Kong East Community Network Speaker: Dr Alan Wai-sing SUEN</td>
<td>Ms Candice TONG Tel: 3108 2513 1 CME Point</td>
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<td><strong>27 FRI 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> The New Era for SGLT2i: A Tool for Heart Failure Treatment and Cardiorenal Protection Organiser: Hong Kong Medical Association Speaker: Dr NG Kei Yan, Andrew</td>
<td>HKMA CME Dept. Tel: 3108 2507 1 CME Point</td>
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<tr>
<td><strong>31 TUE 2:00 PM</strong></td>
<td><strong>Live Lecture</strong> Reducing CV Risk in T2DM Patient: How Can Go Further Organiser: HKMA-KLN West Community Network Speaker: Dr. CHAN Yu Ho</td>
<td>Ms Antonia LEE Tel: 3108 2514 1 CME Point</td>
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### Upcoming Event

5 September 2021 (Sun) 08:20 - 12:30 **LI SHU PUI SYMPOSIUM 2021 (WEBINAR) - COVID-19 and Beyond**
Organiser: Hong Kong Sanatorium & Hospital LSP Lecture Speaker: Prof YUEN Kow-kwong; Keynote Speakers: Prof Ivan HUNG, Dr Joseph CHAN, Dr Raymond YUNG; Speakers: Dr. LAM Bing, Dr LEE Tak-hong, Dr YUEN Shiu-man, Dr Chris CHAN, Dr Edmond MA, Dr Jonpaull ZEE
Enquiry: Hong Kong Sanatorium & Hospital Website: www.hksh.com/lsp2021
Answers to Radiology Quiz

Answers:

1. Acute subarachnoid haemorrhage (SAH). SAH may occur as a result of head injury, or spontaneously from rupture of a cerebral aneurysm, an arteriovenous malformation, or a tumour. Risk factors include high blood pressure, smoking, family history, and cocaine use. Adult polycystic kidney disease is also associated with intracerebral aneurysm. Spontaneous SAH occurs in about 1/10,000 people per year. Females are more commonly affected.

2. CT cerebral angiogram, cerebral digital subtraction angiography to look for aneurysm or arteriovenous malformation.

3. Hydrocephalus, vasospasm.

Dr Carol PY CHIEN
MBBS, FRCR
Endoscopy CAD System OIP-1

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