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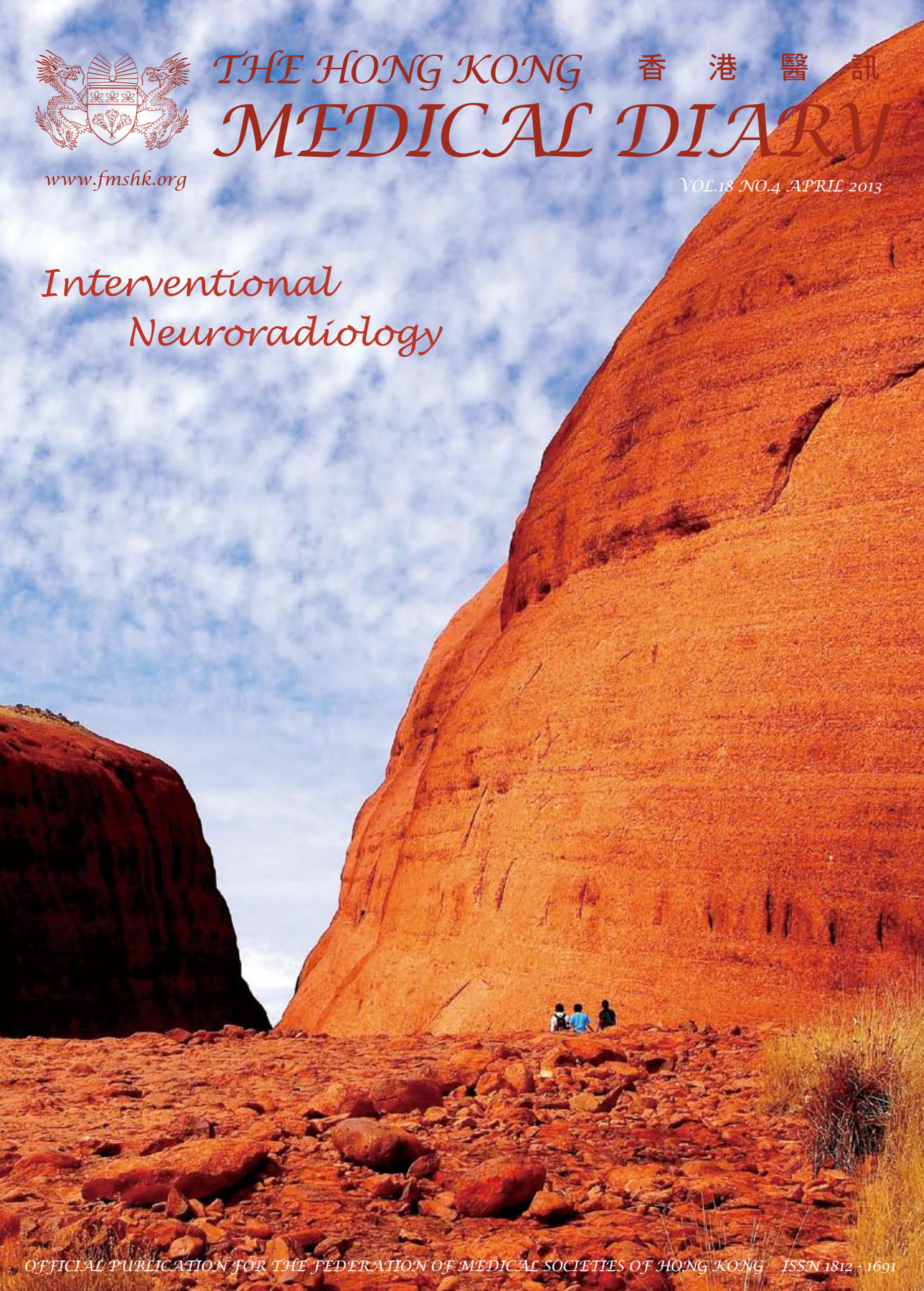

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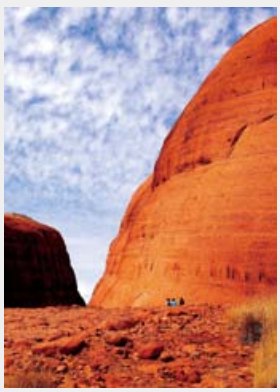

A view of Walpa Gorge, Kata Tjuta, Uluru, Northern Territory, Australia.

Photograph taken on 13 August 2012

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Editorial

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Editor

Prof. Simon CH YU

The medical profession has witnessed significant changes in the management of patients with cerebrovascular diseases in the past two decades. Some of the changes were brought about by the introduction of endovascular interventions.

Interventional neuroradiology in its present state is by no means perfect. It is almost certain that our practice now will change in the coming decades. However, what we do know today will form a basis on which we will advance.

In the current issue, we shall cover cerebrovascular diseases like intracranial atherosclerosis, acute ischaemic stroke, cerebral aneurysm, arteriovenous malformation, and dural carotid-cavernous fistula; and discuss the options of endovascular interventions in the management of patients with such conditions. The first article is a position statement of the Hong Kong Society of Interventional and Therapeutic Neuroradiology on the use of angioplasty and stenting for stroke prevention in patients with intracranial atherosclerotic stenosis, which was published in the Hong Kong Medical Journal in January of 2013, and reproduced with permission from the journal.

I wish to thank Dr. Harold CHENG, Dr. Eddie WONG, and Prof. George WONG for their contribution in the current issue. I hope you will find the articles useful in your practice of medicine, and find them interesting to read even if they are not directly related to your practice.

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Angioplasty and Stenting for Intracranial Atherosclerotic Stenosis: Position Statement of the Hong Kong Society of Interventional and Therapeutic Neuroradiology

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Prof. Simon CH YU

This article has been selected by the Editorial Board of the Hong Kong Medical Diary for participants in the CME programme of the Medical Council of Hong Kong (MCHK) to complete the following self-assessment questions in order to be awarded 1 CME credit under the programme upon returning the completed answer sheet to the Federation Secretariat on or before 30 April 2013.

As a means of preventing secondary ischaemic stroke, angioplasty and stenting are considered potentially beneficial for patients with severe intracranial atherosclerotic stenosis. However, the role of stenting has been challenged since the publication of the first randomised controlled trial on Stenting versus Aggressive Medical Management for Preventing Recurrent stroke in Intracranial arterial Stenosis (SAMMPRIS). This indicated that aggressive medical management was superior to stenting using Wingspan to prevent recurrent stroke, because stenting has a high peri-procedural stroke and death rate. In this paper, we review the management of intracranial atherosclerosis, revisit the skepticism on stenting, and state our position on the topic in the form of recommendations. These are based on the prevalence of the disease in Hong Kong, the high risk of recurrent stroke despite medical therapy in the presence of haemodynamic intracranial stenosis without sufficient collaterals, an analysis of the weak points of SAMMPRIS, and results of clinical studies in Hong Kong.

Intracranial Atherosclerotic Stenosis and Its Treatment

Intracranial atherosclerotic stenosis is responsible for approximately 8 to 10% and up to 33% of ischaemic strokes in the United States and Asia, respectively.[1-3] In patients with intracranial atherosclerosis, the annual stroke risk from all causes is estimated to be 3.6% to more than 13% annually.[4-11]

Current medical management of intracranial stenosis basically depends on antithrombotics to prevent thromboembolic events (over the short term), and reduction of risk factors to prevent disease progression (over the long term). Aspirin, clopidogrel, heparin, and warfarin are used alone or in combination to prevent thromboembolism; whereas, statin therapy is the mainstay for preventing disease progression. However, in a large prospective study it was found that high-grade intracranial stenosis (70-99%) is associated with a high risk of recurrent stroke, despite such medical treatments.[12] In more than 20% of patients, a recurrent ischaemic event in the same vascular territory may occur within 1 year of the index stroke.[12,13] Therefore, with high-grade intracranial stenosis, adjunctive treatment appears warranted. When the degree of vascular stenosis is severe (>70%) in the presence of symptomatic carotid disease, vascular reconstruction is of substantial benefit in preventing ischaemic stroke.14 However, surgical endarterectomy is technically not feasible for intracranial vessels such as the intracranial part of the internal carotid artery and the middle cerebral artery (MCA). Although extracranial to intracranial (EC/IC) bypass had been attempted to improve circulation to the brain, it proved ineffective in reducing the stroke rate. This was the inference from a prospective randomised controlled multi-centre trial of over 1300 symptomatic patients, with MCA stenosis, which showed worse outcomes following EC/IC bypass than after medically treated controls.[8] Another randomised controlled trial involved 195 patients with symptomatic atherosclerotic internal carotid artery occlusion and haemodynamic cerebral ischaemia.[15] After 2 years, EC/IC bypass surgery plus medical therapy was not associated with a reduced risk of recurrent ipsilateral ischaemic stroke when compared to medical therapy alone. The scientific basis for intracranial angioplasty and stenting as a therapeutic option can be found in the recent literature.[12,16,17] A matched comparison between medically treated patients in the Warfarin Aspirin Symptomatic Intracranial Disease study and stent-treated patients in the National Institutes of Health intracranial stent registry concluded that stent placement might offer benefit in patients with 70 to 99% stenosis.[18]

The Wingspan Stenting System

The Wingspan stent system is the first and most widely used self-expanding stent designed to treat intracranial atherosclerotic stenosis (Stryker Medical, Michigan, US).[19] This Food and Drug Administration–approved and literature-supported off-label system comprises a self-expanding nitinol stent preloaded in a delivery catheter, to be used with a separately packaged Gateway PTA balloon catheter (Boston Scientific Corporation, US). Clopidogrel (75 mg orally per day for 3 days before the procedure or 225 mg orally a day before treatment) and aspirin (300 or 325 mg orally per day for 3 days before the procedure or 300 to 650 mg orally on the day before treatment) are given. A bolus of intravenous heparin is given before the procedure to increase and maintain a prolonged activated clotting time. After predilation of the stenosis with the balloon catheter, the stent is deployed across the lesion. Selection of stent size is based on the native diameter of the target vessel (the fully expanded stent diameter should be 0.5 to 1.0 mm greater than the labelled diameter) and when deployed should extend at least 3 mm on either side of the stenotic lesion. The stent delivery catheter is a 3.5-F, coaxial, over-the-wire catheter with segments of varying stiffness and a nominal working length of 135 mm.

The recommended Gateway balloon diameter (when inflated at the nominal pressure of 6 atm) occupies 80% of the native vessel diameter. Undersizing of the balloon is intended to restrict barotrauma to the plaque while minimising intimal damage to the native parent vessel. Following stenting, clopidogrel (75 mg daily by mouth) for 30 days and aspirin (300 or 325 mg daily by mouth) are prescribed for life.[19-24]

Wingspan Stenting as a Treatment for Intracranial Atherosclerosis

The clinical and angiographic peri-procedure outcomes of the initial studies on Wingspan stenting for intracranial atherosclerosis are shown in the Table.[19-21] In these studies, rates of major periprocedural complications (stroke or death) ensuing in the first 30 days varied from 4.5% to 9.6%.[19-21] The Wingspan study by Bose et al[19] enrolled highly selected patients and achieved the lowest rates of peri-procedural stroke or death (4.5%). The studies by Fiorella et al[20] and Zaidat et al[21] represented reports of the same United States multicentre study at two different stages, and showed that the periprocedural stroke or death rate increased from 6.1% (when the patient number was 78) to 9.6% (when the patient number was 129). Published data in the current literature on in-stent restenosis (ISR) following treatment with Wingspan for intracranial atherosclerosis basically came from the same multicentre study group.[22-24] The frequency of ISR in this series was 32% (41/127) overall, and included 28% (36/127) with partial ISR and 4% (5/127) with complete stent occlusion; 15 (37%) of these 41 patients were symptomatic.[22] In that study, the mean follow-up time to imaging was only 8.5 months. Notably, ISR was associated with (i) younger age, namely 14/31 (45%) in those aged ≤55 years versus 15/62 (24%) in persons >55 years, and (ii) lesions located at the internal carotid artery (14/32, 44%) versus other locations (15/61, 25%).[23] In that study, five cases of complete occlusion had been excluded from ISR analysis.

TABLE. Peri-procedure clinical outcomes of Wingspan stenting for intracranial atherosclerotic stenosis[19-21]

Study	No. of patients	Patient age in years (mean ± SD*)	Degree of stenosis (%)	Stenosis after treatment (%)	Technical success rate (%)	Ipsilateral stroke or death rate at 30 day (%)
Bose et al,[19] 2007	45	66	74.9 ± 9.8	31.9 ± 13.6	100	4.5
Fiorella et al,[20] 2007	78	63.6	74.6 ± 13.9	27.2 ± 16.7	98.8	6.1
Zaidat et al,[21] 2008	129	64.2 ± 12.4	82 ± 9	20 ± 16	96.7	9.6

* SD denotes standard deviation

Controversy Regarding Medical Treatment and Wingspan Stenting

Since the publication of the first randomised controlled trial on stenting versus aggressive medical therapy for intracranial arterial stenosis (Stenting versus Aggressive Medical Management for Preventing Recurrent stroke in Intracranial arterial Stenosis (SAMMPRIS),[25] the clinical value of angioplasty and stenting in the prevention of recurrent stroke in patients with intracranial atherosclerotic stenosis is no longer eagerly appreciated. The safety of stenting as revealed by its high peri-procedural stroke and death rate has been a key concern. The results indicated that aggressive medical management was superior to stenting (using Wingspan) in preventing recurrent stroke. In SAMMPRIS, the peri-procedural stroke or death rate within 30 days of Wingspan stenting (14.7%) was unacceptably high and substantially higher than the rates reported in early studies (4.5 to 9.6%).[19-21]

The authors of SAMMPRIS attributed the high rate of periprocedural complications to inclusion of patients with recent symptoms with increased risk of distal embolism during stenting.[26,27] Nevertheless, the high proportion with symptomatic brain haemorrhage (30.3%) among all events resulting in stroke or death within 30 days indicated that haemorrhagic complications related to technical aspects of the stenting procedure might have been causative and warranted further study. The SAMMPRIS authors also argued that the high rate of peri-procedural complications was not due to inexperience of the operators.[25] However, as 30% (10/33) of the peri-procedural strokes were due to symptomatic brain haemorrhage, procedure-related haemorrhagic complications cannot be discounted, and may be consistent with technical factors leading to unsatisfactory outcomes of stent deployment in the large number of participating centres in this study. The importance of the learning curve for intracranial stenting has drawn considerable attention. Notably, a multivariate analysis has shown that (i) any stroke or death within 30 days of stenting, or (ii) a stroke in the territory of the stented artery beyond 30 days, were associated with procedures carried out at low enrolment sites (<10 patients each) versus sites with higher enrolment rates.[28] Based on unpublished data of the first author (SCHY) involving 95 patients treated in a local centre, procedure-related fatal haemorrhagic complications occurred in the 66th patient, indicating that a long learning curve is necessary for this procedure. In the SAMMPRIS study, the 12 highest-enrolling sites enrolled half the patients in the stenting group (n=112); on average 9.3 patients were enrolled in each of these sites. Based on our local centre experience, the caseload in these 'high-enrolment' sites in SAMMPRIS clearly did not meet our criteria for the necessary learning curve period. This could explain why the peri-procedural stroke rate in the SAMMPRIS study did not decline over the course of the enrolment period and did not differ significantly between high- and low-enrolling sites. Given such a background, it is important to take a closer look at the evidence revealed in the SAMMPRIS trial, before we abandon stenting for reasons of safety. Moreover, the trial's published results were limited to 1 year of follow-up, and we are yet to see longer-term outcome data to evaluate whether stenting provides benefits for preventing stroke.

Other Considerations and Local Experience on Wingspan Stenting

Because intracranial atherosclerosis is much more common among Asians than Westerners, doctors in Hong Kong see more patients with haemodynamic strokes or transient ischaemic attacks (TIAs) refractory to medical therapy. We manage patients with haemodynamic intracranial stenosis without sufficient collaterals that have the highest risk of recurrent stroke or TIA, despite medical therapy.[29,30] For these patients with features that are unique to our region, Wingspan stenting may offer a chance of protection from disabling stroke. A study from Hong Kong by Yu et al[31] showed that the peri-procedural complication rate may be much lower (5%, 3/57) when the procedure is performed in a centre with a high caseload and a consistent team of operators. The same study group also reported that although MCAs are relatively more peripheral,

of smaller calibres, and technically more challenging and risky for angioplasty and stenting, there was no significant difference in terms of procedural safety, patient outcomes, and restenosis rates than in those with stenoses located at other sites. This suggests that the clinical applicability of Wingspan stenting is not limited by the location of the intracranial stenosis.[32] These authors reported that even for high-grade MCA stenoses Wingspan stenting did not pose a major risk of occlusion to perforators.[33] Since the primary purpose of intracranial stenting is to widen and maintain the widened lumen of stenotic vessels, ISR is an important concern during the follow-up. Yet in another Hong Kong study, using digital subtraction angiography (DSA) and an established assessment methodology,[22,23] the incidence of ISR at the 1-year follow-up was 17% (11/66).[34] This was lower than the ISR rates reported in other studies. All 11 cases of ISR were asymptomatic. Luminal gain beyond the baseline diameter occurred in 36 (55%) of the lesions. It was also suggested that age is probably unrelated to ISR. Moreover, lesions located at the internal carotid artery are probably less prone to ISR. All these findings were at variance from those reported in previous studies from the West.[22-24]

We learned from these local studies that the safety and treatment outcomes of Wingspan stenting in terms of peri-procedural complications and restenosis rates were in fact more promising in Hong Kong, compared to the West. Therefore doctors in Hong Kong should not be overwhelmed by suboptimal results of Wingspan stenting reported from the West and should not abandon the treatment because of such findings.

Recommendations

Angioplasty and stenting with Wingspan should be considered for patients with intracranial stenosis of ≥70%, presenting with a recurrent ischaemic stroke or TIA, despite medical therapy; with the ischaemic strokes of minor degree and cerebral function that is potentially salvageable, as inferred from a National Institute of Health Stroke Scale score of ≤8 and a baseline modified Rankin Scale score of ≤3, with stenosis confirmed by DSA. Moreover, the stenosis location has to correspond to the vascular territory consistent with the ischaemic event, and with a vessel diameter immediately adjacent to the stenosis of ≥2 mm, and a stenosis length of ≤14 mm. Written informed consent from the patient is necessary. Wingspan stenting should be contra-indicated for patients with ischaemic strokes of non-atherosclerotic aetiology, such as cardiogenic embolism, Moyamoya disease or other vasculitis. It is also contra-indicated if patients have a medical contra-indication to anti-platelet therapy, or a sizable cerebral infarct (>1/3 MCA territory) at risk of haemorrhagic transformation. Concurrent intracranial pathology—such as tumour, arteriovenous malformation, or aneurysm—also constitute contra-indications. Finally, Wingspan stenting should be performed in centres with experienced operators and a consistent team.

Declaration

No conflicts of interest were declared by the authors.

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MCHK CME Programme Self-assessment Questions

Please read the article entitled "Angioplasty and Stenting for Intracranial Atherosclerotic Stenosis: Position Statement of the Hong Kong Society of Interventional and Therapeutic Neuroradiology" by Prof. Simon CH YU and complete the following self-assessment questions. Participants in the MCHK CME Programme will be awarded CME credit under the Programme for returning completed answer sheets via fax (2865 0345) or by mail to the Federation Secretariat on or before 30 April 2013. Answers to questions will be provided in the next issue of The Hong Kong Medical Diary.

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

1. Current medical management of intracranial stenosis is basically anti-thrombotic therapy for the prevention of thromboembolic events over the short term and reduction of risk factors to prevent disease progression over the long term.
2. High grade intracranial stenosis (50-99%) is associated with increased risk of recurrent stroke despite medical treatments.
3. Extracranial to intracranial (EC/IC) bypass for patients with middle cerebral artery stenosis had been proved to be effective in reducing stroke rate as compared to medical therapy alone.
4. Following intracranial stenting, clopidogrel is prescribed for 30 days and aspirin prescribed for 6 months.
5. The results of SAMMPRIS indicated that aggressive medical management was superior to stenting using Wingspan in preventing recurrent stroke.
6. Peri-procedural stroke or death rate is an important factor affecting the clinical value of angioplasty and stenting in patients with intracranial atherosclerotic stenosis.
7. Local data showed that the incidence of in-stent restenosis at 1 year after stenting was >20%.
8. Angioplasty and stenting with Wingspan is indicated for patients with intracranial stenosis ≥ 50%, presenting with recurrent ischaemia stroke or transient ischaemic attack.
9. The diameter of parent artery is not a concern in the procedure of angioplasty and stenting for patients with intracranial atherosclerotic stenosis.
10. Procedures of Wingspan stenting should be performed at experienced centres by a constant team of experienced operators.

ANSWER SHEET FOR APRIL 2013

Please return the completed answer sheet to the Federation Secretariat on or before 30 April 2013 for documentation. 1 CME point will be awarded for answering the MCHK CME programme (for non-specialists) self-assessment questions.

Angioplasty and Stenting for Intracranial Atherosclerotic Stenosis: Position Statement of the Hong Kong Society of Interventional and Therapeutic Neuroradiology

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Answers to March 2013 Issue

Marine Envenomation

1. T 2. T 3. T 4. T 5. T 6. T 7. F 8. T 9. F 10. F

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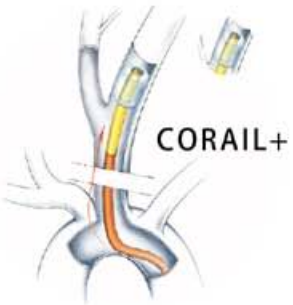
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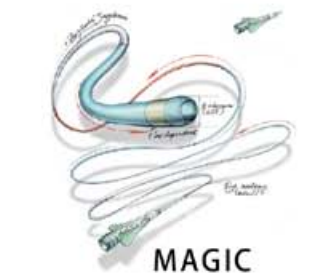
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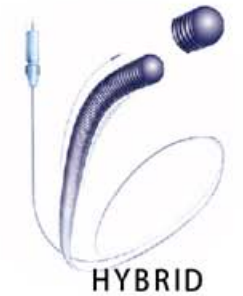
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Endovascular Reperfusion Therapy for Acute Ischaemic Stroke

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In acute ischaemic stroke, rapid restoration of blood flow is the most effective treatment for salvaging ischaemic brain parenchyma that has not already irreversibly infarcted. The time window to achieve this, however, is narrow and benefit of reperfusion decreases continuously over time. Randomised controlled trials have shown intravenous tissue plasminogen activator (IV TPA) given within 4.5 hours from onset increases the probability of good functional outcome (modified Rankin score of 0-2) at 90 days by about 30%.[1,2] Beyond 4.5 hours, harm of IV TPA is likely to exceed benefit, the most important risk being symptomatic cerebral haemorrhage (SICH).[3]

There are contraindications for IV TPA. In most guidelines, ineligibility is strictly defined based on the exclusion criteria of these trials, such as recent stroke, head trauma, or major surgery, any history of intracranial haemorrhage, persisting hypertension >185/110, platelet count <100,000 per mcL, INR > 1.7, or large infarct involving >33% of cerebral hemispheres.[4] A significant portion of patients who present within 4.5 hours cannot receive IV TPA due to one of these medical contraindications. Besides, it is estimated that only one-third of patients will present early enough to be within the therapeutic window.[5] Furthermore, the recanalisation rate with IV TPA is low for patients with large artery occlusions, ranging from 10% for the internal carotid artery (ICA) to 30% for the middle cerebral artery (MCA).[6]

Endovascular reperfusion therapy (ERT) is an alternative with several theoretical advantages. First, it allows direct delivery of thrombolytic agent to the occlusion at lower dosage. Second, endovascular thrombectomy devices may be used for recanalisation, which in some cases spares the use of thrombolytic agents altogether. Third, the recanalisation rate from ERT is higher than IV TPA.[7] The biggest disadvantage of ERT is the delay in initiating treatment, as it involves preparation for the angiogram facility, mobilisation of the interventional team, and the procedure time of getting the catheter to the occlusion site. This is in contrast to IV TPA which can be immediately given after brain computed tomography (CT) by one physician. Other risks of ERT include procedural risk of vessel wall trauma or rupture from catheters and thrombectomy devices, and distal embolisation of thrombus fragments. Costs in facilities, equipment, interventional team personnel, as well as their training, are also much higher for ERT.

So is ERT worth the extra risk and cost? One may start by examining the evidence from clinical trials. In PROACT II study from 1999, patients with MCA occlusion treated with intra-arterial (IA) urokinase within 6 hours of onset were significantly more likely to attain functional independence at 90 days compared to the IV heparin treatment arm (40% versus 25% respectively).[8] To date, it remains the only positive double-blind trial of ERT. Over the last decade, a multitude of thrombectomy devices have become available in the market. They can be deployed alone or used in adjunct to IA pharmacological thrombolysis. Devices which have been approved in the United States and Europe for clot removal within 8 hours of onset in selected patients included Merci clot retriever, Penumbra system with combined clot fragmentation/suction, and thrombus-capturing Solitaire and Trevo retrievable stents. The data on clinical benefit for these devices are less robust. Approvals for their use were based on results from uncontrolled open case series. The Merci device, which utilises a corkscrew-like nitinol wire to entrap thrombus, has been shown in the Multi-MERCI study to achieve approximately 60% recanalisation rate and favourable clinical outcome in 36% of 164 patients of stroke onset within 8 hours.[9] Similarly, the Penumbra system could achieve 81% recanalisation, but only 25% with favourable outcome in a single-arm study of 125 patients.[10] Retrievable stents have been shown to achieve a higher recanalisation rate of up to 90%, and better favourable outcome rate of up to 50% when compared to the Merci device.[11,12] They are deployed across the occlusion in a similar fashion to intracranial stents without detaching from the delivery catheter. The deployed stent immediately creates a channel through the compressed thrombus. It can then be retrieved after embedding the thrombus. Improved likelihood of good clinical outcome was probably due to shorter average procedure time of 45 minutes, compared to 90 minutes for the Merci device. The overall rate of SICH in patients treated with ERT is around 10%.

While results from single-arm ERT series appear promising in high recanalisation rate for severe stroke from large artery occlusion, for more than a decade the key question remains whether it results in better clinical outcome when compared head-to-head with IV TPA. The just published SYNTHESIS and IMS III randomised controlled trials have finally addressed this. The SYNTHESIS trial randomly assigned 362 patients within 4.5 hours of onset to ERT or IV TPA. At three months, 30.4% of ERT- and 34.8% of IV TPA-treated patients were alive without disability. IV TPA treatment was commenced on average at 2.75 hours after onset, compared to 3.75 hours for ERT.[13] This delay of 1 hour to arrange ERT plus the procedure time have probably negated the benefit gained from better recanalisation. Based on this rationale, a treatment strategy of starting IV TPA first followed by ERT may circumvent the delay. This hypothesis was tested in the IMS III trial, which randomly assigned 656 patients to IV TPA followed by

ERT, versus IV TPA alone. The trial was prematurely terminated due to futility.There was no significant difference in attaining functional independence between the combined IV TPA/ERT and IV TPA alone groups (40.8% versus 38.7% respectively). The recanalisation rate for the ERT group was 65-81% depending on occlusion site. The SICH (6%) and overall death rates (20%) were similar between two groups. Subgroup analysis showed trend favouring combined treatment for severe stroke of National Institutes of Health Stroke Scale (NIHSS) ≥ 20, or if ERT was started within 90 minutes of initiating IV TPA.[14] Disappointingly for ERT, both trials have validated the "time is brain" concept. Recanalisation is futile if the treatment, such as ERT, is delayed in a real world situation.

So what does the future hold for ERT given the latest unfavourable findings? First, it remains a viable treatment option for patients ineligible for IV TPA within 4.5 hours due to medical contraindications. Second, retrievable stents may further improve the speed as well as extent of recanalisation compared to existing devices such as Merci and Penumbra, which were used predominantly in the SYNTHESIS and IMS III trials. Third, for patients presenting after 4.5 hours & up to 8 hours, or with uncertain onset time (e.g. wake-up stroke), there may still be a role for ERT. This is despite the MR RESCUE trial, which was limited by the heterogeneity of its relatively small sample (n=118), found patients with ischaemic penumbra on perfusion imaging treated with ERT up to 8 hours did not recover better compared to standard care.[15] Fourth, for posterior circulation occlusion, the therapeutic window for ERT is probably longer at up to 12 hours, and worth pursuing given the dismal outlook of extensive brainstem infarct. Nevertheless, the biggest challenge for ERT to prove its efficacy would be recruiting patients for further trials to compare new devices with IV TPA. The natural tendency is for both patients' families and physicians to try "do everything" for those presenting with large disability strokes, especially when the use of these devices have already been approved by the US Food and Drug Administration.

Based on currently available evidence, IV TPA remains the standard-of-care for eligible acute ischaemic stroke patients within 4.5 hours of onset. On the other hand, ERT is a viable option in selected patients with severe stroke from large artery occlusion who are unsuitable for IV TPA. It offers these patients a second chance of achieving meaningful neurological recovery. Advocacy for its more widespread application will depend on the development of more efficient and safer thrombectomy devices.

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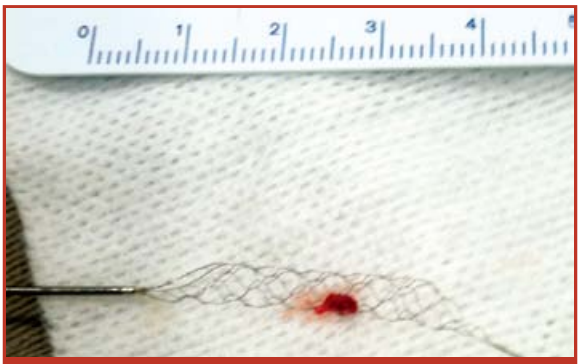
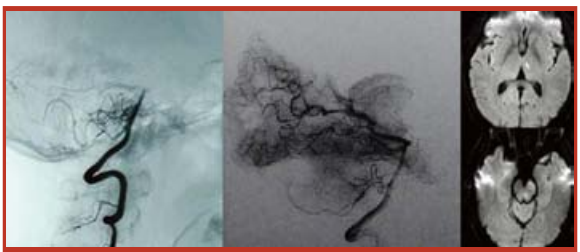
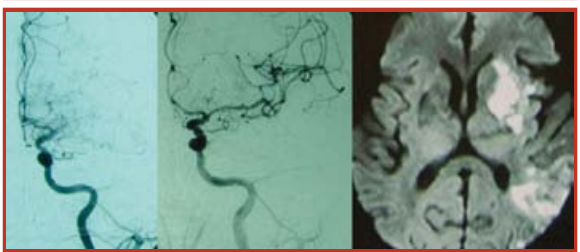


Figure 1. Deployed Trevo retrievable stent with thrombus embedded



Case illustration 1. 53 years old male with history of previously undiagnosed rheumatic heart disease and atrial fibrillation presented with vertigo, ophthalmoplegia, bulbar palsy and right hemiplegia. Cerebral angiogram at 150 minutes showed basilar artery thrombosis. Full recanalisation was attained at 210 minutes with 16mg of TPA intra-arterially. Follow-up MRI on day 1 showed small infarcts at left thalamus and pons only. He made full neurological recovery.



Case illustration 1. 82 years old male with history of atrial fibrillation presented with right hemiplegia and aphasia at 180 minutes. Cerebral angiogram at 270minutes showed left middle cerebral artery occlusion. Partial recanalisation with 10mg intra-arterial TPA and balloon angioplasty attained at 340 minutes. Follow-up MRI on day 1 showed scattered left basal ganglia and posterior parietal infarcts. He made partial recovery with residual dysphasia and cognitive impairment.

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Paradigm Shift in Endovascular Intervention of Unruptured Cerebral Aneurysms- from Coiling to Flow Diverters

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Director, Vascular and Interventional Radiology Clinical Science Centre, The Chinese University of Hong Kong

Prof. Simon CH YU

The Background

Cerebral aneurysm is a potential health hazard that is estimated to occur in about 3% of the Hong Kong population. Aneurysm rupture is a cause of intracranial bleeding that may lead to severe disabilities and the death rate is as high as 45%. The risk of rupture of an aneurysm is about 1.3% per year. In the overall population, the incidence rate of aneurysm rupture is 10.5 per 100,000 people. The aetiology of cerebral aneurysm is thought to be associated with hypertension, atherosclerosis, and congenital factors leading to vessel wall weakening. Although endovascular coiling is a well established treatment for intracranial aneurysms, unfavourable aneurysm features such as wide neck, large size, and fusiform morphology, as well as post-treatment recanalisation, remain important challenges[1-6]. Stent-assisted coiling has been developed to address these challenges, but it is associated with relatively high rates of aneurysm recurrence (15%) and procedure-induced mortality[7]. Such limitations of coiling have fuelled continual search for better endovascular options for treatment of intracranial aneurysms. Endovascular placement of flow diversion devices such as Pipeline Embolisation Device (PED, ev3 Neurovascular, Irvine, California) for endoluminal circumferential reconstruction of segmental vascular defects as a treatment for intracranial aneurysms is gaining widespread attention[8-11].

The Concept

The use of 'flow diverters' (Pipeline) is a technological breakthrough in the treatment of cerebral aneurysms. The Pipeline is a highly-flexible tube-like device composed of 48 tightly knitted cobalt-chromiun strands, to be implanted in the vascular segment affected by the aneurysm using a percutaneous endovascular approach, covering the necks of the aneurysms. After placement of flow diverters, blood flow is diverted away from the aneurysm, blood flow entering the aneurysm becomes slow and homogeneous, so that the aneurysm eventually regresses and becomes thrombosed, and the device is incorporated into the vessel wall by endothelialisation. The treatment is applicable to vessels of diameter 2.5mm to 5mm, independent of the size or morphology of the aneurysm. Blood flow in the arterial side branches covered by the device is preserved.

The Procedure

The procedure is performed under general anaesthesia and involves arterial puncture and catheterisation through the right common femoral artery using a 6 French guiding catheter (Neuron Delivery Catheter, 6F 053, Penumbra Inc., Alameda, California), and microcatheters (Renegade HI-Flo, Boston Scientific, Natick, Massachusetts, or Marksman, eV3 Neurovascular). The purpose is to place one device across the vascular segment harbouring the aneurysm, however, an additional device may be required if one device is not sufficient to cover the neck of the aneurysm. To prevent acute thrombosis of the device following placement, patients are treated with oral clopidogrel 75mg daily and aspirin 80mg daily for 3 days before treatment and for 3 months afterwards. At least 80mg of daily oral aspirin is then given for another 3 months. Intravenous heparin is administered during the procedure to maintain an activated clotting time between 250 to 300 seconds.

Hong Kong Data

In a multicentre local study involving 7 Hong Kong hospitals, conducted from September 2008 to September 2011 on 143 patients and 178 aneurysms, the flow diverter (Pipeline) was found to be a safe and effective treatment for cerebral aneurysms with unfavourable morphological features and post-treatment recanalisation[12]. Patients having a history of intracranial haemorrhage within 50 days were excluded. The study included 36 male and 107 female patients, of mean age 54.9 years. The aneurysms were either saccular or fusiform aneurysms, that were either untreated and unruptured, or recurrent aneurysms following previous treatment. Thirty-four of all 178 aneurysms (19.1%) had been treated with coiling or surgical clipping previously and recurred subsequently.

The procedure of Pipeline placement to completely cover the aneurysm was successfully accomplished in all aneurysms (100%). For most of the cases (81.5%), only one 'flow diverter' (Pipeline) was placed in each aneurysm. Patients were followed-up after the treatment for an average of 17.6 months (ranged from 3 to 39.2 months), complete occlusion was found in 55.7% of aneurysms at 6 months, 81.3% of aneurysms at 12 months, and 84.5% of aneurysms at 18 months.

Ten of 13 patients (76.9%) completely recovered from presenting symptoms of cranial nerve palsy within a median duration of 3.5 months. The peri-procedure death or major stroke rate was 3.5%. All parent arteries remained patent without occlusion in all 178 aneurysms during the follow-up period. Mild parent artery stenosis to a degree of 20% to 30% occurred in 1.4% of the cases. Occlusion of the arterial side branches occurred in 1.4% of the cases without clinical consequences. In 3 patients with perforating arteries covered by 1 or 2 Pipeline at M1 segment, clinical or CT evidence of perforator infarction did not occur[12].

The peri-procedure death or major stroke rate within 30 days was 3.5% (5/143, 95%CI 1.3% to 8.4%). There was 1 case of ipsilateral ischaemic stroke due to small left capsular infarct immediately after Pipeline placement (mRS=4). There were 2 cases of major intracerebral haemorrhage (mRS=5,6) in vascular territories independent from locations of instrumentation or Pipeline placement. The former occurred 27 days post-Pipeline. The latter occurred on the day of Pipeline placement, after abciximab administration for acute parent artery thrombosis. There were 2 cases of major haemorrhagic stroke (mRS=5,6) due to post-treatment delayed rupture of large aneurysms that were untreated previously (22mm, 25mm). After the occurrence of delayed rupture in these cases, concomitant coiling of aneurysms at the time of Pipeline placement was performed for previously untreated aneurysms of size ≥20 mm, with a purpose to induce a stable organised thrombus involving fibrin formation, not for complete coil occlusion of the aneurysm. Afterwards, delayed rupture of large aneurysms did not occur in the 6 coiled aneurysms of size ≥20 mm[12].

Other Studies on Flow Diverters

A review of 6 other studies on flow diverters for unruptured intracranial aneurysms, including Pipeline and SILK flow diverter (SFD, Balt Extrusion, Montmorency, France)[8-11,13,14] showed that procedure success rates in terms of device placement were high for the two devices and had always been 100% successful for Pipeline[8, 9, 11]. Complete aneurysm occlusion rates at 6 months had been high (40.8-93.3%). Suboptimal apposition of device to vessel wall and acute or delayed thrombosis of parent artery were extremely uncommon or rare. Stenosis of parent artery at 6 months and delayed post-treatment aneurysm were also extremely rare. The results of these previous studies have also suggested that the safety and treatment effectiveness of flow diverters are promising.

Application

For intracranial aneurysms with unfavourable morphology for coiling and those aneurysms with post-coiling recurrence, the availability of an alternative treatment option of reasonable safety and effectiveness is of significant clinical importance. Knowledge on the complication risks of coiling with or without balloon or stent assistance in treatment of unruptured intracranial aneurysms may provide a reference on the safety of Pipeline for unruptured aneurysms. In the ATENA study of 649 patients with unruptured intracranial aneurysms, thromboembolic complications and intra-procedural aneurysm rupture occurred in 9.7% procedures, neurological complications including death occurred in 5.4% of patients[15]. Taking into account a relatively high aneurysm recurrence rate of 14.9% with endovascular coiling[7], flow diverter is a reasonably promising alternative treatment. However, owing to the requirement of antiplatelet therapy before and after the procedure, flow diverters are recommended only for treatment of unruptured aneurysms or recurrent aneurysms that have been treated before with or without rupture. The treatment is not recommended for acute rupture of cerebral aneurysms.

Conclusion

Flow diverter using Pipeline is a reasonably safe and effective treatment for intracranial aneurysms, the treatment is promising for aneurysms of unfavourable morphological features such as wide neck, large size, fusiform morphology, incorporation of side branches, and post-treatment recanalisation, and should be considered as a first choice for treating unruptured aneurysms and recurrent aneurysms following previous treatments.

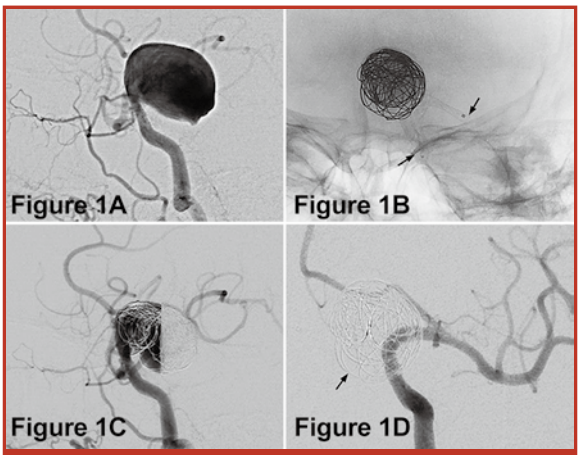

Figure 1. In a patient presenting with cranial nerve palsy, a large intracranial aneurysm of 24mm diameter at supraclinoid internal carotid artery was shown on DSA in lateral view (A). After placement of PED across the neck of aneurysm following concomitant coiling at same session, PED (between arrows) was depicted on radiograph in frontal view (B). Dense packing was not performed because the purpose of coiling was not to achieve complete coil occlusion of the aneurysm. DSA in lateral view (C) subsequently revealed partial stasis of contrast media at the dependent part of the aneurysm. Six months after treatment, DSA in frontal view (D) showed complete obliteration of the aneurysm.

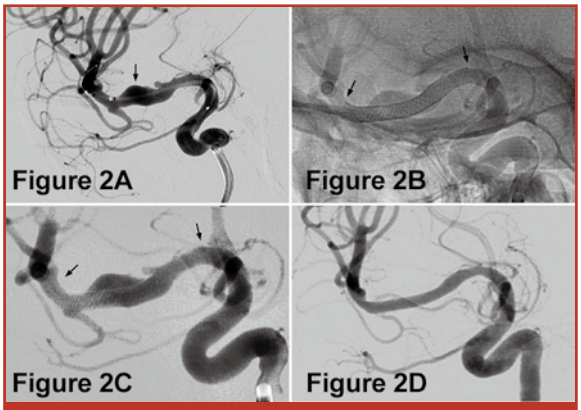

Figure 2. A fusiform aneurysm of M1 segment of right middle cerebral artery was incidentally discovered on CTA in this patient. DSA in oblique view (A) performed just before placement of PED showed the fusiform aneurysm (arrow), a small saccular aneurysm next to it, and adjacent perforating arteries. After placement of two PED of size 2.5mm X 20mm and 2.75mm X 20mm respectively, angiography in the same oblique view without subtraction (B) and with subtraction (C) showed coverage of the two aneurysms and perforating arteries by PED (between arrows). Three months after treatment, DSA in the same oblique view (D) showed complete obliteration of the two aneurysms and preservation of the perforating arteries.

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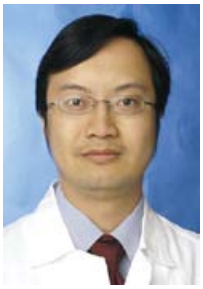
Endovascular Treatment of Cerebral Arteriovenous Malformation



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What is Cerebral Arterioveonus Malformation?

Cerebral arteriovenous malformation (AVM) is a developmental anomaly composed of thin-walled and thick-walled channels connecting arteries to veins without intervening capillary beds. Cerebral AVM is considered a high flow vascular lesion. Concurrent aneurysms may exist in feeder, nidus, or as venous varix. Ninety percent are hemispheric and fifteen percent are located in the posterior fossa. Commonest age of presentation is between 20 and 40 years, but twenty-five percent present before 20 years of age. There is no sex predilection. The annual incidence of cerebral AVM is estimated to be 1-2 per 100,000 population.

Clinical Manifestations of Cerebral AVM

Haemorrhage is the commonest presentation and accounts for more than half of the new case referrals. Intracerebral haemorrhage occurs more commonly, although subarachnoid haemorrhage and intraventricular haemorrhage can occur. Other presentations include seizure, headache, tinnitus, and focal symptoms. In children younger than 2 years of age, presentation can include congestive heart failure and large head due to hydrocephalus. Vascular malformation–related steal phenomena that cause focal neurological deficits by altering perfusion in the tissue in the region of the AVM are distinctly uncommon in treatment-naive cerebral AVMs.

Radiological Diagnosis of Cerebral AVM

Intracranial AVMs may be diagnosed with a variety of diagnostic imaging studies. Computed tomography (CT) without contrast has a low sensitivity, but calcification and hypointensity may be noted; enhancement is seen after contrast administration. CT angiography and venography can provide accurate diagnosis in emergency settings[1]. Magnetic resonance imaging (MRI) is very sensitive, showing an inhomogeneous signal void on T1- and T2-weighted sequences, with blooming artefact (haemosiderin) signifying prior haemorrhage[2]. Magnetic resonance angiography (MRA) can also provide critical information detailing the localisation and topography of an AVM as intervention is being considered. Catheter arteriography or digital subtraction angiography (DSA) is the "gold standard" for defining the arterial and venous anatomy, including such as presence of intranidal or feeding artery aneurysms, comprehensive data on venous drainage patterns, or subtle AVM nidus characterisation. In addition, superselective angiography can provide functional and physiological data important to clinical decision analysis.

Cerebral AVM Grading System

The Spetzler-Martin grading scale is the commonest clinical classification to describe a cerebral AVM. The lesion is graded on the basis of size, pattern of venous drainage, and neurological eloquence of adjacent brain[3]. All AVMs fall into one of six grades. Grade I malformations are small, superficial, and located in non-eloquent cortex; Grade V lesions are large, deep, and situated in neurologically critical areas; and Grade VI lesions are essentially inoperable AVMs. Application of this grading scheme to series of surgically excised AVMs has consistently demonstrated correlations with the incidences of postoperative neurological complications.

Although the Spetzler-Martin grading scale was designed to predict surgical outcome, it has also been evaluated in the combined management of AVMs, including resection, surgery plus embolisation, embolisation alone, or radiosurgery, with various combinations. The scale does not include characteristics such as associated aneurysms, venous stasis, or venous aneurysms that have been associated with haemorrhagic risk.

Natural History of Cerebral AVM

Many case series suggest that cerebral AVM has an average of 2-6 percent annual risk of recurrent haemorrhage, depending on whether there is a history of haemorrhage, and therefore should be considered for treatment. The risk of recurrent haemorrhage is even higher in a recently ruptured cerebral AVM[4].

One controversial natural history datum was from the Columbia AVM database project. Two hundred eighty-one unselected, consecutive, prospectively enrolled patients with cerebral AVM were grouped according to their initial clinical presentation-142 presented with and 139 without haemorrhage[5]. The frequency of AVM haemorrhages during the subsequent clinical course (before the start of endovascular, surgical, or radiation treatment) in the two groups was compared by means of the Kaplan-Meier life-tables, log-rank

test, and multivariate proportional-hazards regression models. Haemorrhage was defined as a clinically symptomatic event with signs of acute bleeding on computed tomography or magnetic resonance brain imaging. During mean follow-up of 8.5 months for the haemorrhage group and 11.9 months for the non-haemorrhage group, haemorrhages occurred in 18 (13%) of the former patients and in three (2%) of the latter (p=0.0002). The annual risk of haemorrhage was 17.8% and 2.2%, respectively. In the multivariate regression model, the adjusted hazard ratio for haemorrhage at initial presentation was 13.9 (95% CI 2.6-73.8; p=0.002). Deep venous drainage (hazard ratio 4.1 [1.2-14.9], p=0.029) and male sex (9.2 [2.1-41.3], p=0.004) were also significantly associated with subsequent haemorrhage, but no significant association was found for age or AVM size. The annual rate of spontaneous haemorrhage was 32.6% for men and 10.4% for women in the haemorrhage group compared with 3.3% for men and 1.3% for women in the non-haemorrhage group. Among patients with haemorrhage at initial presentation, the risk of haemorrhage fell from 32.9% in year 1 to 11.3% in subsequent years (34.2% to 31.0% in men; 31.1% to 5.5% in women).

However, uniquely in their subsequent analysis, treatment of unruptured cerebral AVM was associated with increased risks of haemorrhage ($p < 0.0001$; hazard ratio (HR) = 5.53, 95% CI 2.91 to 10.49) and of clinical impairment as assessed by a Rankin score > 2 (HR = 11.04, 95% CI 7.21 to 16.90, $p < 0.0001$) [www.arubastudy.org]. This observation is the driving force behind the ongoing ARUBA (A Randomised US and European Multicentre Clinical Trial of Unruptured Brain AVMs). ARUBA aims to determine whether medical management improves long-term outcomes (5-10 years, deaths from any form of stroke, death or clinical impairment) of patients with unruptured BAVMs compared to interventional therapy (with endovascular procedures, neurosurgery, or radiotherapy, alone or in combination)[6]. The target sample size is 400 and more than 200 patients have been recruited into the study. Completion of the currently recruited patients is sufficient to give a preliminary clinical meaningful interpretation.

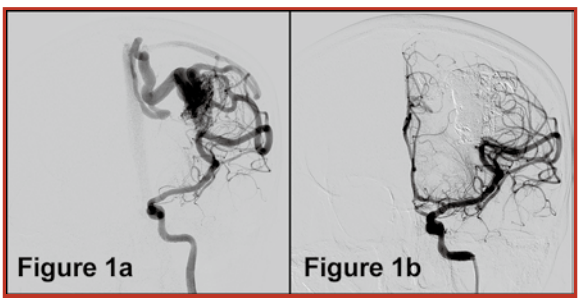
Treatment Option

There are 4 major treatment options available for patients with an AVM of the brain. The lesion can be monitored expectantly with the understanding that the patient would have some risks of haemorrhage or other neurological symptoms such as seizures or focal deficits. Alternatively, intervention can be undertaken with the goal of complete AVM obliteration, because subtotal therapy does not confer protection from haemorrhage. Management strategies include single or combined therapy applying microsurgery, endovascular techniques, or radiosurgery (focused radiation). In general, surgical excision can be considered as the sole therapy for most small AVMs locating in superficial non-eloquent areas, especially those with recent haemorrhage[7]. Depending on the local expertise, endovascular treatment could be considered for small AVMs with favourable vascular anatomy or as a component for staged treatment of high grade AVMs, as well as for treatment of associated aneurysms and fistulae. For small AVMs located in eloquent areas or with unfavourable feeding vessel anatomy, stereotactic radiosurgery can be considered[8]. For Spetzler-Martin grade III AVM, management strategy such as staged treatment, multimodality treatment, hypofractionated radiosurgery, or observation should be considered[9]. Treatment of Spetzler-Martin grade IV and V should only be recommended after careful balance between expected complete obliteration rate and natural history, and treatment risk[10].

Endovascular Cyanoacrylate Embolisation

The n-Butyl Cyanoacrylate, or n-BCA, is a kind of 'glue' that is injected through a microcatheter into the AVM nidus. Upon contact with blood, n-BCA solidifies so that the flow of blood to the nidus is blocked. Local experience showed that using a 20–25% mixture of cyanoacrylate in contrast medium, the overall cure rate was 22%[11]. The cure rate was higher in whom 1) the nidus was not larger than 3 cm, 2) the number of feeders did not exceed three, and 3) the nidus was accessible with the tip of the microcatheter. Endovascular n-BCA embolisation could also be offered as a size-reducing preoperative procedure or as a flow-reducing palliative procedure.

Endovascular Onyx Embolisation



Digital subtraction Angiogram of cerebral AVM (a) Before Onyx embolisation; (b) After Onyx embolisation.

Before the introduction of Onyx, standard endovascular treatment consisted of embolisation with particles or n-butyl-cyanoacrylate (NBCA) glue. Embolisation with particles alone has not been very effective, given the small-lumen flow-directed microcatheters used and the high recanalisation rate. The NBCA polymerises quickly in contact with ionic solutions, with the risk of microcatheter gluing, and thus the amount of glue injected per catheterisation is limited. Frequently, multiple catheterisations of

AVMs are necessary to achieve a high rate of occlusion. Onyx (ev3 Neurovascular, Covidien) was introduced as a new embolic material for the endovascular treatment of cerebral AVMs. Onyx is non-adhesive, yet cohesive and precipitates slowly, which seems to be advantageous in AVM embolisation. Onyx was first introduced to Hong Kong on 13 October 2007[12]. Onyx is supplied in ready-to-use vials. Each vial contains ethylene-vinyl alcohol copolymer, dimethyl sulfoxide (DMSO), and tantalum. The vials are kept on a shaker

for at least 20 minutes to ensure proper mixing of the tantalum powder. The lower the concentration of the copolymer, the less viscous is the agent. If the mixture comes into contact with an aqueous solution, precipitation of the copolymer is initiated by diffusion of DMSO. This process begins on the surface while the core is still liquid, resulting in a soft, non-adherent mass. Therefore, Onyx has a lava-like flow consistency within blood vessels and does not fragment during injection. Onyx 18 is recommended for embolisation of cerebral AVM nidus. Then Onyx was slowly and progressively injected into the nidus using the plug and push technique, under continuous visual control using subtracted fluoroscopy. DMSO-compatible detachable tip microcatheters are now available for Onyx AVM embolisation, which allows prolonged injection for more than 30-45 minutes. Local experience showed an overall cure rate of 33% using non-detachable microcatheters[12]. In cerebral AVM less than 3cm in diameter, achieving a nidal microcatheter position produced aniographic cure in a single session, whereas subtotal occlusion (over 80% occlusion) was achieved in 75% of Spetzler-Martin grade III/IV AVMs[12]. In referral centres where Onyx embolisation is considered as the primary treatment of most AVMs, angiographic cure can be achieved in 51% of patients with 1% mortality, 7% morbidity, and 1% recanalisation[13].

Conclusions

Treatment of cerebral AVM requires understandings of the natural history, AVM anatomy, and interdisciplinary approach. Endovascular treatment could be considered for small AVMs with favourable vascular anatomy or as a component for staged treatment of high grade AVMs, as well as for treatment of associated aneurysms and fistulae.

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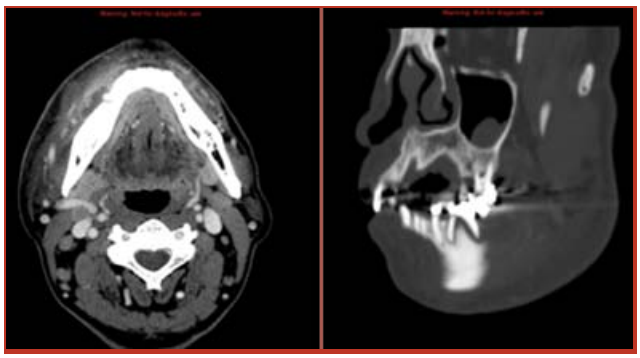
Radiology Quiz

Dr. Grace HO

MBChB

Department of Radiology, QMH



History: M/61 Good past health. 'E' admission x right submandibular swelling x 1/7
P/E: Submandibular fluctuant swelling and tenderness
Ix: XRay Mandible. Urgent CT Neck x extent of submandibular abscess

Questions:

What are your findings and management plan?

(See P.34 for answers)

Current Management of Carotid-Cavernous Fistula

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Dr. Kin-ming CHENG

Introduction

Carotid-cavernous fistula is an abnormal communication between the carotid artery and the cavernous sinus. The cavernous sinus is a venous cavern between two layers of dura of the anterior skull base. It receives venous drainage of the eye and the brain via the ophthalmic veins and superficial middle cerebral vein. There are venous communications between the opposite cavernous sinus, the clival venous plexus and the transverse sinus (Fig. 1). CCF was first described by Travers (1809) who recognised pulsating exophthalmos to be due to an arterio-venous shunt and treated it with common carotid ligation[1]. Although surgical ligation often produced initial good results, collateralisation from the arterial branches of the external and internal carotid arteries produced high recurrence rates. Later, Brooks (1931) surgically opened the internal carotid artery in the neck and floated a strip of muscle into the fistula and Gardner (1932) described internal carotid artery ligation as a method of treatment[1]. It was Serbinenko (1974) who described the use of the detachable balloon technique to obliterate the fistula and leave the carotid artery patent[2]. Nowadays, neuro-endovascular therapy offers a safer and more effective treatment of CCF[3,4,5,6].

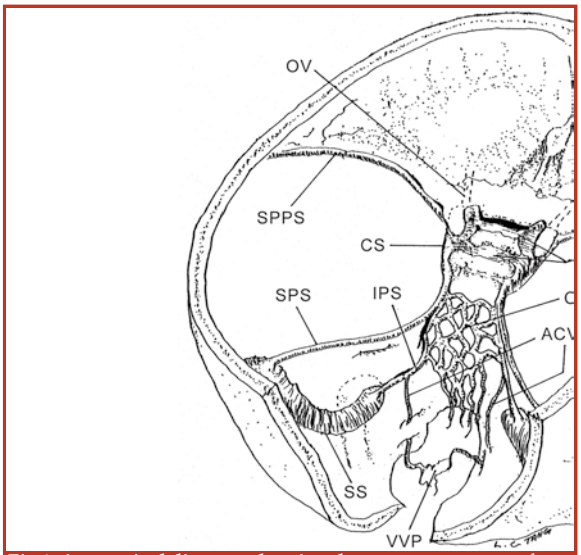

Fig 1. Anatomical diagram showing the venous anatomy of cavernous sinus. OV = ophthalmic veins, SPPS = sphenoparietal sinus, CS = cavernous sinus, IPS = inferior petrosal sinus, SPS = superior petrosal sinus, SS = sigmoid sinus, VVP = vertebral venous plexus, ACV = anterior condylar vein, CVP = clival venous plexus, ICS = inter-cavernous sinus.

Aetiology

Carotid-cavernous fistulae can be classified into traumatic and spontaneous types. The traumatic type is caused by severe head injury after high velocity traffic accidents, major skull base fractures or penetrating wounds through the orbit. The spontaneous type can be congenital, secondary to a ruptured cavernous sinus aneurysm into the cavernous sinus or acquired with multiple branches of the carotid arteries that shunt into the cavernous sinus. The latter type is commonest in Hong Kong and is usually called dural carotid-cavernous fistula (DCCF). In Hong Kong, a traumatic cause is uncommon and most are spontaneous in origin. In Queen Elizabeth Hospital (1997-2012), a total of 125 cases of CCF were treated. One hundred and twenty cases were spontaneous (96%) and only 5 (4%) cases were of the traumatic type.

Pathophysiology

The abnormal arterio-venous shunt creates a high venous pressure in the cavernous sinus that impairs venous drainage of the ophthalmic veins and causes eye congestion and increase in intraocular pressure (Fig 2). The increase in cavernous sinus pressure also causes pressure effects on the third, fourth and sixth cranial nerves that resulted in ophthalmoplegia. In addition, CCF creates back pressure in the cerebral veins that can lead to intracerebral haemorrhage (Fig 3).

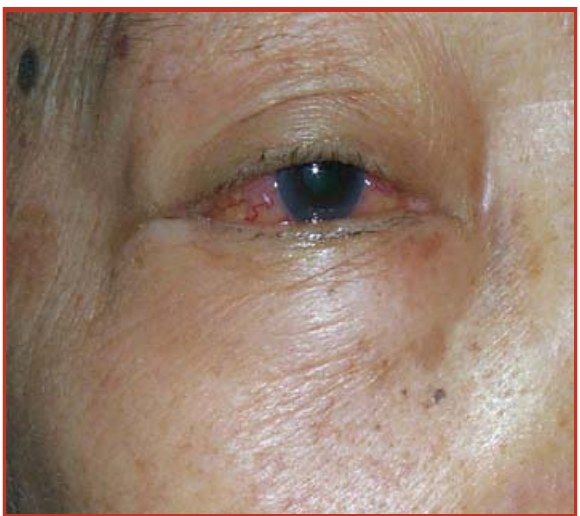

Fig 2. Clinical picture of a patient with eye signs of CCF.

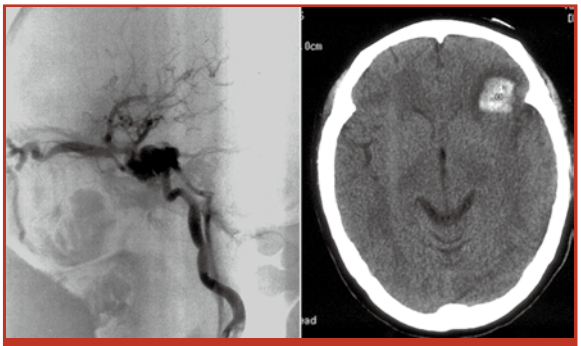

Fig 3a: Left internal carotid angiogram, lateral view, showing a direct CCF.

Fig 3b: CT scan, axiall view, showing intracerebral haemorrhage.

Clinical features

Carotid-cavernous fistula usually presents with chemosis, proptosis, diplopia and visual impairment of the eye. Rarely, CCF can cause cerebral dysfunction (hemiplegia, dysphasia, etc). The clinical presentation of traumatic CCF is acute but some of the cases can present one week after the injury. Spontaneous CCF is usually insidious in onset. Physical signs include eye bruit, pulsatile exophthalmos, cranial nerve palsies (3th, 4th and 6th) and impaired vision.

Investigations

Carotid-cavernous fistula can be diagnosed with imaging studies. CT scan with contrast may show skull base fractures, a dilated superior ophthalmic vein and venous engorgement in the region of the cavernous sinus. MRI and MR angiography are useful tools for screening and follow-up of the patients. Cerebral angiography is a more invasive form of imaging study which provides the best diagnostic study of CCF. Selective internal and external carotid angiograms are essential to define the anatomy and develop the treatment plan. Venograms will facilitate early selection of the optimal venous route and enhance the efficacy of transvenous catheterisation and embolisation of the cavernous sinus[7].

Treatment

In the past, CCF was treated with surgical operations with significant morbidity and mortality. In the modern era, neuroendovascular therapy offers a safe and effective treatment for patients with CCF and has replaced open surgery as the treatment of choice. If the operators have good communication with the patients, the majority of the endovascular procedures can be done under local anaesthesia. The procedure starts with arterial and venous punctures in the groin region. Catheters and co-axial microcatheters are introduced via the femoral route to the intracranial circulation. The endovascular approaches can be transarterial or transvenous. The embolic materials include polyvinyl alcohol particle, histoacryl glue, onyx, balloon, platinum coil and Guglielmi detachable coil. Although technically more difficult to perform, the transvenous approach is safer and more effective than the transarterial approach and is recommended as the treatment of choice in most cases of dural CCF. The sequence of occlusion of the cavernous sinus during the transvenous embolisation should be, firstly, the occlusion of the venous outflow of the cortical veins and the ophthalmic veins and then the rest of the cavernous sinus[4]. The transvenous routes include the inferior petrosal sinus, intercavernous sinus, superior ophthalmic vein (Fig 4,5,6) and rarely, cortical vein, superior petrosal sinus and pterigoid venous plexus. Clinical cure can be achieved in more than 90% of the patients and the procedure-related morbidity and mortality are very low[5,6].

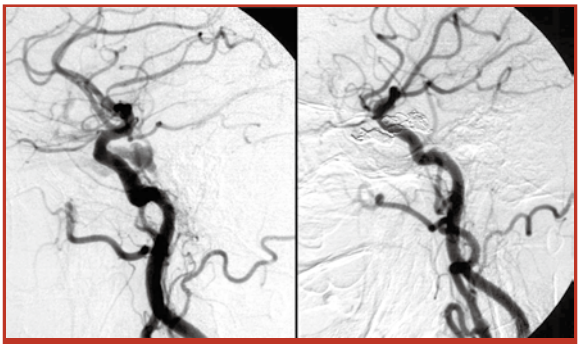

Fig 4a: Left common carotid angiogram, lateral view, showing a DCCF with retrograde venous drainage to superficial sylvian vein and superior ophthalmic vein.

Fig 4b: Immediate post-embolisation angiogram, lateral view, showing complete occlusion of the DCCF.

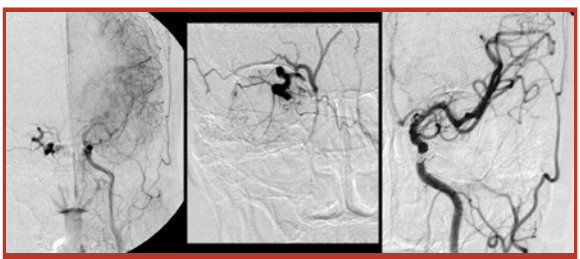

Fig 5a: a: Left common carotid angiogram, anteroposterior view, showing a bilateral DCCF.

Fig 5b: Venogram, anteroposterior view, showing the position of the microcatheter from left to right via the left inferior petrosal sinus and inter-cavernous sinus into the right superior ophthalmic vein.

Fig 5c: Left common carotid angiogram, anteroposterior view showing complete obliteration of the bilateral DCCF.

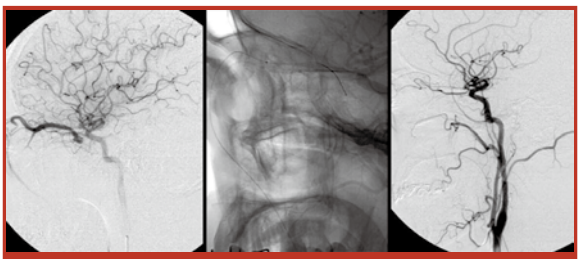

Fig 6a: Left internal carotid angiogram, lateral view, showing a dural CCF anterior to the internal carotid artery with venous drainage into the superior ophthalmic vein.

Fig 6b: Skull x-ray, lateral view, showing the passage of the microcatheter via the facial vein into the superior ophthalmic vein.

Fig 6c: Post-embolisation angiogram, lateral view, showing complete occlusion of the DCCF with coils.

Conclusion

Carotid-cavenous fistula is a well-known disease entity that will be encountered in daily clinical practice. CCF can cause visual and neurological deficits when the condition is left untreated. Diagnosis of CCF can be made by clinical examination and imaging studies. Neuroendovascular therapy is safe and effective and is the treatment of choice in patients with CCF. The transvenous approach is preferred because of the high clinical cure rate and low procedure-related morbility and mortality.

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Certificate Course on

Quality of Life in Research and Clinical Practice

Jointly organised by

The Federation of Medical Societies of Hong Kong

Hong Kong Society for Quality of Life

Objectives:

This course aims to familiarize participants on the current knowledge and skills of quality of life (QOL) in research and clinical practice. Specifically, it introduces the concept of QOL and discusses the selection of QOL measures, the use of QOL in economic evaluation, the assessment of QOL in Chinese medicine, the validation of QOL measures and the interpretation of QOL results in practice. The target audience includes investigators, clinicians and public health professionals who had used or are preparing themselves to use QOL for outcome assessment.

3 Jul

Topic :	Introduction of Quality of life assessment and Patient Reported Outcome
Speaker :	Mr. Kwok-fai LEUNG Department Manager, Department of Occupational Therapy Queen Elizabeth Hospital; Founding Chairman, Hong Kong Society for Quality of Life

10 Jul

Topic :	Selection of an appropriate measure in QOL research
Speaker :	Mr. Kwok-fai LEUNG Department Manager, Department of Occupational Therapy Queen Elizabeth Hospital; Founding Chairman, Hong Kong Society for Quality of Life

17 Jul

Topic :	QOL and health preference in health economic evaluation
Speaker :	Dr. Carlos King-ho WONG Post-doctoral Fellow Department of Family Medicine and Primary Care The University of Hong Kong; Life Member, Hong Kong Society for Quality of Life

24 Jul

Topic :	QOL assessment in Chinese Medicine
Speaker :	Dr. Wendy WONG Post-doctoral Fellow Department of Family Medicine and Primary Care The University of Hong Kong; Vice Chairman, Hong Kong Society for Quality of Life

31 Jul

Topic :	Psychometric evaluation of QOL measures
Speaker :	Dr. Daniel Yee-tak FONG Associate Professor, School of Nursing The University of Hong Kong; Chairman, Hong Kong Society for Quality of Life

7 Aug

Topic :	Interpretation of QOL data
Speaker :	Dr. Daniel Yee-tak FONG Associate Professor, School of Nursing The University of Hong Kong; Chairman, Hong Kong Society for Quality of Life

Date : 3 July 2013 – 7 August 2013 (Every Wednesday)
Time : 7:00 pm – 8:30 pm
Venue : Lecture Hall, 4/F., Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong
Language Media : Cantonese (Supplemented with English)
Course Fee : HK$750 (6 sessions)
Certificate : Awarded to participants with a minimum attendance of 70%
Enquiry : The Secretariat of The Federation of Medical Societies of Hong Kong
Tel.: 2527 8898 Fax: 2865 0345 Email: info@fmshk.org

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A total of 9 CNE points for the whole course and the points will be awarded according to the number of hours attended
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CME/CNE Course | CERTIFICATE COURSE FOR DENTAL NURSE | Course No. C207

Certificate Course on

Dental Nursing in Oral Surgery 2013

Jointly organised by

The Federation of Medical Societies of Hong Kong

The Hong Kong Association of Oral and Maxillofacial Surgeons Limited

Date	Topics	Speakers
19 April	Oral and Maxillofacial Surgery Overview	Dr. Mike Yiu-yan LEUNG *Assistant Professor* *The University of Hong Kong*
26 April	Minor Oral Surgery Overview	Dr. Julianna Cho-hwei LIEW *Specialist in Oral and Maxillofacial Surgery* *Dental Officer, Queen Mary Hospital*
3 May	Dental Implant Surgery	Dr. Raymond Lop-keung CHOW *Private Practice*
10 May	Peri-operative Nursing	Ms. Phenita Kit-ching LI Ms. Lai-har LEUNG *OT nurse, Queen Mary Hospital*
24 May	Medical Emergency in Dental Clinic	Dr. Alfred Sze-lok LAU *Private Practice*
31 May	Sedation in Oral Surgery / Dentistry	Dr. John Matthew Say-woon LOW *Private Practice*

Enquiry : The Secretariat of The Federation of Medical Societies of Hong Kong
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藥品實務技能提升課程

課程對象：

- 獸醫診所助理
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- 零售藥房櫃台員
- 新入藥業行業行政人員
- 外國回流藥劑師
- 資本市場投資行政人員
- 任職分發藥物之醫療專業人士，如診所護士及安老院舍護理員

日期	主題	講師
4月20日	• 藥品分類、保健品實務 • 危險藥品	Mr. Nelson Lam
4月27日	• 專業和員工法規守則	Mr. Stanley Wong
5月4日	• 藥品零售、批發管理 • 法規修訂、進出口規範	Mr. Stanley Wong Mr. Nelson Lam
5月11日	• 連鎖藥房實習 • 零售收銀系統和報表實務	Mr. Nelson Lam Mr. Chester Cheng
5月18日	• 牙醫和獸醫專題 • 怎樣與醫生藥師實務溝通	Mr. Nelson Lam Mr. Stanley Wong
5月25日	• 獸醫醫院（藥品）實習 • 中國醫藥保（省、市、鐵路）實務與香港的醫改發展	Mr. Nelson Lam

聯合主辦：

香港醫學組織聯會

香港醫藥經銷業協會

課程編號：C221

日期：2013年4月20, 27日及5月4, 11, 18, 25日(逢星期六)
時間：晚上7：30至9：00（每課1.5小時）
地點：香港灣仔軒尼詩道15號溫莎公爵社會服務大廈4樓演講廳
授課語言：廣東話
費用：港幣 $980
查詢：香港醫學組織聯會秘書處 電話：2527 8898 傳真：2865 0345 電郵：info@fmshk.org

Federation Spring Dinner

The Federation celebrated the 2013 Chinese New Year Spring dinner on 27 February. It was a festive occasion as well as an excellent opportunity for the President, the Officers, the Executive Committee Members, the Foundation Directors and the Secretariat to gather in fun and laughter, with fine food and wine. We look forward to the prosperous year of the Snake!

The Federation's time in RTHK Health Programme

"Federation's time", a regular medical, dental and healthcare education session in collaboration with RTHK Radio One's programme (精靈一點), was well received by the audience since its re-launching from January to March 2013 as the second series after the first one launched 2 years ago. The programme runs from 1.30pm to 2pm every Thursday and many more hot topics have been discussed on air to the public.

After reporting January's programmes in the March issue of the Hong Kong Medical Diary, it is time for those programmes in February and March.

In February, the participating guest speakers, on behalf of their respective societies, included Dr. Johnny CHAN from the American College of Chest Physicians (Hong Kong and Macau Chapter), Dr. Tai-pang IP from The Osteoporosis Society of Hong Kong, Dr. Yat-wah YEUNG from The Hong Kong Society of Gastroenterology and Dr. Tony Tai-sum LAI from the Hong Kong Association for Child and Adolescent Psychology and Psychiatry.

The sessions in March carried on with guest speakers from the Hong Kong Society for Molecular Diagnostic Sciences Limited, the Hong Kong Surgical Laser Association, The Hong Kong Burns and Wound Healing Society Limited and The Hong Kong Continence Society Limited.

We would like to extend our appreciation to all the above participating guest speakers and their member societies. Your active participation and support is highly encouraged through browsing the online updated radio programme on the following link - http://www.fmshk.org/fmshk.php?id=295.

The Hong Kong Neurosurgical Society (HKNS)

The Hong Kong Neurosurgical Society (HKNS) was established in 1981 as a professional body aimed at promoting training, research and fellowship. We now have over 80 members that include trainees, specialists and allied health personnel from both the public and private sectors. There is a Nurse Chapter as well as special interest groups (e.g., neurospine). Our Council of nine members meets monthly under the leadership of the current President, Dr KY YAM of Tuen Mun Hospital. We hold a monthly academic meeting during which a trainee or an invited non-neurosurgeon speaker would deliver a lecture, followed by a Grand Round presentation of interesting clinical materials. There is also a regular neuroradiology meeting organised jointly with private practitioners. Tutorials for high surgical trainees are conducted six-weekly. We actively support local training events such as the HA Commissioned Training, seminars organised by individual centres, and lectures for non-neurosurgeons. Trainees who attend overseas conferences and courses may also receive funding support from us. Our two-day Annual Scientific Meeting provides a platform for academic exchanges between local researchers and overseas faculties. This meeting is not infrequently conjoined with other international events such as the Asian Congress of Neurosurgeons. We participate actively in various media events to promote public awareness and education. Our website (www.ns.org.hk), established in 2002, has received over a million hits. To promote research, we fund member-initiated projects. So far, one multi-centred study on brain tumours has been completed and two others on stroke and neurotrauma are underway. To promote fellowship, we hold sporting events for members and their families. Visits to centres in China Mainland and Macau serve to extend our network beyond the territory. The HKNS will continue to advance the knowledge, practice and development of clinical neurosurgery and neurosciences in Hong Kong.

The Guild of St. Luke, St. Cosmas and St. Damian Hong Kong

The Guild of St. Luke, St. Cosmas and St. Damian Hong Kong (香港天主教醫生協會) was founded by a group of Hong Kong Catholic doctors in 1953 guided by late Fr. Cronin Fergus S.J., with the aim to promote the study and discussion of medical questions and of upholding or safeguarding Catholic Practitioners' ethics and morality. Founding members included Prof. Gerald Choa, Sir Albert Rodrigues, Prof. John HO, Sr. Mary Gabriel and Prof. Rosie YOUNG. Every year we organise lectures and seminars, open forums to discuss current controversial bioethics issues. We also serve the public through charity services and educational talks on public health. Year 2013 is our 60th anniversary. We began our celebration with a pilgrimage trip to Spain. In the coming months we will have a lecture series on Natural Family Planning, with focus on the Creighton Model Fertility Care System and NaproTechnology in the treatment of infertility. This is a new scientific technology in Hong Kong to deal with infertility (www.creightonmodel.com). The introductory talk will be held on 6th April at Talentum Bookshop. Another seminar will be held on 29th June. All are welcome and details can be found in our website: http://doctor.catholic.org.hk.

Dr. Ambrose LEUNG
Master

The American College of Chest Physicians (Hong Kong and Macau Chapter)

The "Fighting Pneumonia 2013 Kick-off Ceremony" on 24th Feb 2013, officiated by Dr. Wing-man KO, Secretary for Food and Health and the Presidents of the three local Respiratory Societies.

The American College of Chest Physicians (Hong Kong and Macau Chapter), being probably the earliest professional respiratory society in Hong Kong, was established in the early 1960s. Its objectives include the promotion of a high standard of clinical practice, research and education of Respiratory Medicine in Hong Kong, as well as provision of high quality educational programmes. Apart from our close partners, the Hong Kong Thoracic Society (HKTS) and the Hong Kong Lung Foundation (HKLF), the Chapter has also been collaborating with other local and international organisations in various activities over the years.

In the past 2 years, apart from our Annual Scientific meetings and bi-monthly clinical meetings, our Chapter and HKTS have also organised 2 Certificate Courses for nurses and allied health professionals (with the Federation of Medical Societies of Hong Kong) and 2 Certificate Courses on Non-invasive Ventilation. Our Executive Committee members have also participated in the Local Organising Committee of the 17th Congress of Asian Pacific Society of Respirology held on 14-16 Dec 2012. As we believe the education of the public would be as equally important as in health care workers, we have also been getting more involved with our local community. A series of publicity and educational activities have been held in the past two years to escalate public awareness on Spirometry, COPD and Lung Cancer, including press conferences, carnival, health & spirometric checks, educational talks, radio programmes and written articles in various media. As our 2013 theme would be "pneumonia", we have organised a press conference "Fighting Pneumonia 2013 Kick-off Ceremony and Reflections on SARS by Respiratory Medical Professionals" on 24th Feb 2013, with the aim to alert the public on the importance and continuing threat of pneumonia in Hong Kong. While such activities were all well received, our efforts would continue.

Dr. Johnny WM CHAN
Immediate Past President

Hong Kong Society for Molecular Diagnostic Sciences (HKSMDS)

Hong Kong Society for Molecular Diagnostic Sciences (HKSMDS) was found in July 2003 right after the SARS epidemic was called to a haul in Hong Kong. The need to promote the molecular diagnostic testing services to the society becomes more inevitable and indispensible.

Through the Board of Directors, our Society has worked to develop programmes for training and certification in diagnostic molecular pathology. The organisation is divided into the scientific subdivisions of infectious diseases, genetics, haematopathology, and solid tumours. Each subdivision addresses issues, identifies goals, shapes policy, and provides member benefits specific to that particular discipline.

HKSMDS membership includes professionals from the academia, government, and industry, including medical doctors, scientists, laboratory directors, medical laboratory technologists, and those with interests in molecular pathology especially those involved in regulatory procedures of this emerging testing field.

During the past decade, our Society had consistently organised local training programmes and seminars in conjunction with the HKSAR government. Three major regional events were conducted in October 2006, August 2010 and October 2012 respectively (The 1st, 2nd and 3rd Asian Pacific Symposium of Advanced Molecular Technologies) with an aim to promote and exchange sharing of ideas and experience with peers in the field. The recent one was held in collaboration with the Singapore Society of Pathology in Singapore in October last year.

As an affiliation to the International American Society of Clinical Pathology (ASCPi), our Society also provides comprehensive training courses in molecular pathology to clinical, scientific and technical personnel in the private, public and government sectors prepared for the International Molecular Biology Certification Programme in 2011, 2012 and 2013. Our forthcoming event of HKSMDS is to organise an International Conference on Advanced Molecular Technologies (ICAMT, March 2014) in conjunction with The Hong Kong Polytechnic University, The Chinese American Association of Clinical Microbiology (CAACM), and the Association of Molecular Pathology. Updates of conference information are available on www.hkicamt2014.org. HKSMDS is open to all collaborations with medical and scientific societies with an interest in promoting diagnostic and research advancement in molecular pathology. Visit us on www.hksmds.org

Dr. Daniel TAM
President

The Hong Kong College of Family Physicians

The Hong Kong College of Family Physicians was first incorporated on 22nd July 1977. The objective of the College is to promote and develop good quality "Family Medicine" practice for the community of Hong Kong by providing facilities for training, assessment and continuing medical education in Family Medicine for Members of the College. We strive to establish and maintain high standards of learning, skill and conduct in general practice.

At present, the College consists of 8 Boards and 15 Committees monitored by a Board of Censors and run by 19 council members of the College. We have over 1,500 members from our various categories of Members.

The College is going to organise the 3rd Hong Kong Primary Care Conference on June 16, 2013, with the theme of "**Innovations in Primary Care**", highlighting innovations in education, research and healthcare delivery in primary care. This conference serves as an impetus for bringing together experts, clinicians and healthcare professionals in addressing present and future challenges. We hope to provide a fertile platform for networking opportunities, open exchange of experiences and views on latest developments and trends in primary care among different disciplines in addition to sharing of latest scientific updates and research activities.

This conference will feature exciting blends of plenary sessions, workshops, seminars, paper and oral presentations. This year, we have added "**Novice Research Paper Award**" in our full Paper competition to stimulate and engage our junior doctors and healthcare professionals in evidence-based research. Furthermore, we will also award the "**Best Oral Presentation**" and "**Best Poster Presentation**" for the free paper submissions.

We warmly invite you all to submit abstracts for free paper presentations, to participate in our Full Paper Competition and Clinical Case Competition and most importantly, to register for the conference.

The Hong Kong Thoracic Society

The Hong Kong Thoracic Society (HKTS) was established in August 1987. As of March 2013, we have over 1,000 members. The Society works along with the following objectives:
1. To promote the advancement of study of thoracic diseases.
2. To coordinate and correlate the efforts of organisations, companies, associations, societies, institutions, statutory bodies and other authorities and individuals interested in the causes, diagnosis, prevention and treatment of thoracic diseases with a view to reduce morbidity and mortality in Hong Kong.
3. To promote, foster, develop and assist medical and allied profession in the study of and the acquisition, dissemination and application of knowledge and information concerning the causes, diagnosis, prevention and treatment of thoracic disease.

Apart from our close local partners, the American College of Chest Physicians (ACCP) (Hong Kong and Macau Chapter) and the Hong Kong Lung Foundation (HKLF), HKTS has also been collaborating with other local and international organisations in various activities over the years.

World Spirometry Day (全球肺功能日) Educational Programme held on 17th June 2012 at the Quarry Bay Community Hall. There were more than 300 participants and wide media coverage. The European Respiratory Society (ERS) appreciated our local activities and both London and Hong Kong served as good examples as cited from ERS website. Many volunteers worked for this activity as shown in the photo.

On 14-16 December 2012, the 17th Congress of the Asian Pacific Society of Respirology was successfully held at the Hong Kong Convention and Exhibition Centre with 2,310 participants. This congress was hosted by HKTS and sponsored by HKLF. In the past 2 years, apart from our Annual Scientific Meetings and bi-monthly clinical meetings, HKTS and ACCP (HK & Macau Chapter) had also organised 2 Certificate Courses for nurses and allied health professionals (with the Federation of Medical Societies of Hong Kong) and 2 Certificate Courses on Non-invasive Ventilation. We have also organised a series of publicity and educational activities in the past 2 years to escalate public awareness on chronic obstructive pulmonary disease, spirometry, and lung cancer and this included press conferences, carnival, health & spirometric checks, educational talks, radio programmes and written articles in various media. While such activities were all well received, our efforts would continue and the theme of this year's educational activities would be "pneumonia".

Dr. Fanny WS KO
President

The Hong Kong Medical Association

The Hong Kong Medical Association, founded in 1920, aims to bring together Hong Kong's government, institutional, university and private medical practitioners for an effective exchange of views and co-ordination of efforts. The foremost objective of the Association is to safeguard and promote public health. The Association speaks collectively for its members and aims to keep its members abreast of medical ethics, issues and advances around the world. In fulfilling these goals, the Association hopes to better serve the people of Hong Kong. Today, HKMA has more than 100 representatives in various Governmental and non-governmental boards and councils.

Together with the British Medical Association (Hong Kong Branch), the HKMA also founded the Federation of Medical Societies of Hong Kong in 1965. Internationally, HKMA is a member of the Confederation of Medical Associations in Asia and Oceania (since 1973) and a member of the World Medical Association (since 1977).

For its 9,000+ members, HKMA runs two clubhouses, a choir and an orchestra. Since 1990, HKMA has been raising funds for various charitable organisations through public performance of its choir, orchestra and the efforts of its trailwalkers. The HKMA Charitable Foundation was established in 2006 to consolidate and strengthen all these efforts.

As an official CME accreditor, administrator and organiser, HKMA holds regular CME functions at its own premises, centrally located hotel function rooms as well as venues at the districts easily accessible by members practising in the peripheral areas. There is also an annual exchange programme with the Chinese Medical Association on topical subjects in the form of a medical conference held alternately in Hong Kong and a mainland city. It also organises all kinds of sports, cultural and recreational activities for its membership.

For the practising doctors with puzzles in their daily practice, the duty Council members will come to their help. For medico-legal issues, the scheme of cooperation with the Medical Protection Society will back members up. All you need is to call up the Secretariat on 2527 8285, e-mail to hkma@hkma.org or visit our website on www.hkma.org.

The Hong Kong Society of Sleep Medicine

The Hong Kong Society of Sleep Medicine was established by Professor Char-nie CHEN, Honorary Clinical Professor of Psychiatry, The Chinese University of Hong Kong, in 1993. A group of sleep specialists were called for clinical discussion at the time, including Psychiatrists, Respiratory physicians, Paediatricians and ENT surgeons. Out Society aims to promote sleep health and education, to improve sleep services and monitor sleep medicine training in Hong Kong.

Today, we have regular clinical meetings among members for interesting case presentations. There are also public seminars and events for education purposes in the general public. In our Annual Scientific Meetings, local and overseas speakers are invited to share their expert views in the latest understanding and management of different sleep and sleep related breathing disorders. This year, it will be held at the Park Lane Hotel, Causeway Bay, on 5 October.

In 2010, the Sleep Examination working group was formed to prepare for the First Fellowship Sleep Medicine Examination as supported by the World Sleep Federation. We are going to hold the **First "International Sleep Medicine Examination"** in Hong Kong on 23 November 2013 and the deadline of application is on 30 May 2013. There will be a series of tutorials in the examination format for all examination candidates from April to July 2013, and a Sleep Medicine Review Course will be conducted by International Sleep experts from 3-5 October 2013. Please visit our website: www.HKSSM.org for application and other information.

We have over 100 members in our Society at present, and there is a subcommittee of Registered Polysomnography Technologists (RPSGT). These nurse/ technologists help to perform diagnostic sleep studies and manual scoring of sleep tracings in clinical practice. We believe that standard training for doctors, nurses and technologists in sleep medicine is of utmost importance.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	* HKMA Tai Po Community Network - DPP-4 inhibitors: Raising Expectations * FMSHK Officers' Meeting * HKMA Council Meeting 2	3	4	* HKMA Shatin Doctors Network - Practical Tips on Management of Major Depressive Disorder 5	* Hong Kong Powerlifting Championships 2013 6
7	8	* HKMA Tai Po Community Network - Management of Chronic Hepatitis B - Latest Update 9	* Hong Kong Neurosurgical Society Monthly Academic Meeting – Brain Metastasis and the Latest Guideline on Radiosurgery for Brain Metastasis * HKMA Central, Western & Southern Community Network - Improving Osteoporosis Diagnosis and Management * MPS Workshop – Mastering Your Risk 10	* HKMA Hong Kong East Community Network - Optimizing Treatment for ED * HKMA Structured CME Programme with Hong Kong Sanatorium & Hospital Year 2013 – Practical Clinical Approaches for Patients with Musculoskeletal Complaint * MPS Workshop – Mastering Adverse Outcomes 11	* HKMA Shatin Doctors Network - Current Management of Allergic Rhinitis & its Co-morbidities * Recreation and Sports Club for Hong Kong Professional Bodies 2013 Party 12	* Refresher Course for Health Care Providers 2012/2013 13
* Joint Professional Singing Competition 14	15	* HKMA Kowloon West Community Network – Management of Type 2 Diabetic Patients with Comorbidities * HKMA Tai Po Community Network - Treat to Target in Rheumatoid Arthritis 16	17	* FMSHK Executive Committee Meeting 18	* HKMA Shatin Doctors Network – Respiratory Disease Management - Airway Hyper-responsiveness and Asthma * HKMA Kowloon City Community Network - Update Management on ACS Disease – Prevention and Treatment * HKMAPS Exhibition 19	* HKMAPS Exhibition * Integrative Medicine for Sleep and Mood Disorders: From Traditional Empiricism to Clinical Trials 20
* HKMAPS Exhibition * HKMA Snooker Tournament 2013 (Day 1) 21	22	* HKMA Tai Po Community Network - PDE5i Once Daily Dosing to Treat Erectile Dysfunction 23	24	* HKMA New Territories West Community Network - Paediatric Lower Limb Torsional Problems: Intoeing/ Outtoeing * HKFMS Foundation Committee Meeting 25	* HKMA Yau Tsim Mong Community Network - Diabetic Nephropathy Management 123 * HKMA Shatin Doctors Network - Improvement in Osteoporotic Management * The 7th Annual Scientific Meeting – Enhancement and Removal of Memory 26	* The 7th Annual Scientific Meeting – Enhancement and Removal of Memory 27
* HKMA Snooker Tournament 2013 (Day 2) 28	29	* HKMA Kowloon West Community Network - Paediatric Vaccines Update on Varicella & MMR Prevention * HKMA Tai Po Community Network - Symptom and Exacerbation Management in COPD 30				

Date / Time	Function	Enquiry / Remarks
2 TUE 1:45 pm	**HKMA Tai Po Community Network - DPP-4 inhibitors: Raising Expectations** Organiser: HKMA Tai Po Community Network, Speaker: Dr. SO Wing Yee, Venue: Chiu Chow Garden, Shop 001-003, 1/F, Uptown Plaza, Tai Po, NT	Mr. Joseph TAO Tel: 6341 1532 1 CME point
8:00 pm	**FMSHK Officers' Meeting** Organiser: The Federation of Medical Societies of Hong Kong, Venue: Gallop, 2/F., Hong Kong Jockey Club Club House, Shan Kwong Road, Happy Valley, Hong Kong	Ms. Nancy CHAN Tel: 2527 8898
8:00 pm	**HKMA Council Meeting** Organiser: The Hong Kong Medical Association, Chairman: Dr. TSE Hung Hing, Venue: HKMA Head Office (5/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Hong Kong)	Ms. Christine WONG Tel: 2527 8285
5 FRI 1:00 pm	**HKMA Shatin Doctors Network - Practical Tips on Management of Major Depressive Disorder** Organiser: HKMA Shatin Doctors Network, Chairman: Dr. MAK Wing Kin, Speaker: Dr. KWAN Ka Lik, Venue: Jasmine Room, Level 2, Royal Park Hotel, 8 Pak Hok Ting Street, Shatin	Ms. Ivy LEUNG Tel: 3189 8782
6 SAT 12:00 nn	**Hong Kong Powerlifting Championships 2013** Organiser: The Hong Kong Medical Association, Venue: Queen Elizabeth Stadium, Arena	Ms. Dorothy KWOK Tel: 2527 8285
9 TUE 1:45 pm	**HKMA Tai Po Community Network - Management of Chronic Hepatitis B - Latest Update** Organiser: HKMA Tai Po Community Network, Speaker: Dr. SO Man Kit, Venue: Chiu Chow Garden, Shop 001-003, 1/F, Uptown Plaza, Tai Po, NT	Mr. Freddy WONG Tel: 6270 3233 1 CME point
10 WED 7:30 am	**Hong Kong Neurosurgical Society Monthly Academic Meeting – Brain Metastasis and the Latest Guideline on Radiosurgery for Brain Metastasis** Organiser: Hong Kong Neurosurgical Society, Chairman: Dr. TAN Tze Ching, Speaker: Dr. YUEN Ming Him, Michael, Venue: Seminar Room, Ground Floor, Block A, Queen Elizabeth Hospital	Dr. Gilberto LEUNG Tel: 2255 3368 1.5 CME points
1:00 pm	**HKMA Central, Western & Southern Community Network - Improving Osteoporosis Diagnosis and Management** Organiser: HKMA CW&S Community Network, Chairman: Dr. LAW Yim Kwai, Speaker: Dr. WAN Man Choi, Venue: HKMA Central Premises, Dr. Li Shu Pui Professional Education Centre, 2/F., Chinese Club Building, 21-22 Connaught Road Central, Hong Kong	Miss Hana YEUNG Tel: 2527 8285 1 CME point
6:30 pm	**MPS Workshop – Mastering Your Risk** Organiser: The Hong Kong Medical Association, Speaker: Dr. HAU Ka Lam, Venue: HKMA Dr. Li Shu Pui Professional Education Centre, 2/F, Chinese Club Building, 21-22 Connaught Road, Central, Hong Kong	HKMA CME Dept. Tel: 2527 8452 2.5 CME points
11 THU 1:00 pm	**HKMA Hong Kong East Community Network - Optimizing Treatment for ED** Organiser: HKMA Hong Kong East Community Network, Chairman: Dr. AU Chi Lap, Speaker: Dr. YIP Wai Chun, Andrew, Venue: HKMA Head Office (5/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Hong Kong)	Ms. Candice TONG Tel: 2527 8285
2:00 pm	**HKMA Structured CME Programme with Hong Kong Sanatorium & Hospital Year 2013 – Practical Clinical Approaches for Patients with Musculoskeletal Complaint** Organiser: The Hong Kong Medical Association, Speaker: Dr. LEE Ka Wing, Gavin, Venue: HKMA Dr. Li Shu Pui Professional Education Centre, 2/F, Chinese Club Building, 21-22 Connaught Road, Central, Hong Kong	HKMA CME Dept. Tel: 2527 8452 1 CME point
6:30 pm	**MPS Workshop – Mastering Adverse Outcomes** Organiser: The Hong Kong Medical Association, Speaker: Dr. HUNG Chi Wan, Emily, Venue: Eaton Smart Hotel	HKMA CME Dept. Tel: 2527 8452 2.5 CME points
12 FRI 1:00 pm	**HKMA Shatin Doctors Network - Current Management of Allergic Rhinitis & its Co-morbidities** Organiser: HKMA Shatin Doctors Network, Chairman: Dr. MAK Wing Kin, Speaker: Dr. CHOW Chun Kuen, Venue: Jasmine Room, Level 2, Royal Park Hotel, 8 Pak Hok Ting Street, Shatin	Ms. Ivy LEUNG Tel: 3189 8782 1 CME point
	Recreation and Sports Club for Hong Kong Professional Bodies 2013 Party Organiser: The Hong Kong Medical Association, Venue: Football Club	Miss Nadia HO Tel: 2527 8285
13 SAT 2:30 pm	**Refresher Course for Health Care Providers 2012/2013** Organiser: The Hong Kong Medical Association, Speaker: Dr. LAI Wai Man, Sonia, Venue: Training Room II, 1/F, OPD Block, Our Lady of Maryknoll Hospital, 118 Shatin Pass Road, Wong Tai Sin, Kowloon	Ms. Clara TSANG Tel: 2354 2440 2 CME points
14 SUN 3:00 pm	**Joint Professional Singing Competition** Organiser: The Hong Kong Medical Association, Venue: Music Stage, 11B, Tontex Industrial Building, San Po Ko	Miss Phoebe WONG Tel: 2527 8285
16 TUE 1:00 pm	**HKMA Kowloon West Community Network – Management of Type 2 Diabetic Patients with Comorbidities** Organiser: HKMA Kowloon West Community Network, Chairman: Dr. LEUNG Gin Pang, Speaker: Dr. CHAN Wing Bun, Venue: Crystal Room I-III, 30/F, Panda Hotel, 3 Tsuen Wah Street, Tsuen Wan, NT	Miss Hana YEUNG Tel: 2527 8285 1 CME point
1:45 pm	**HKMA Tai Po Community Network - Treat to Target in Rheumatoid Arthritis** Organiser: HKMA Tai Po Community Network, Speaker: Dr. CHAU Shuk Yi, Lucia, Venue: Chiu Chow Garden, Shop 001-003, 1/F, Uptown Plaza, Tai Po, NT	Mr CHONG Tel: 9353 1090 1 CME point
18 THU 1:00 pm	**FMSHK Executive Committee Meeting** 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	Ms. Nancy CHAN Tel: 2527 8898
19 FRI 1:00 pm	**HKMA Shatin Doctors Network – Respiratory Disease Management - Airway Hyper-responsiveness and Asthma** Organiser: HKMA Shatin Doctors Network, Chairman: Dr. MAK Wing Kin, Speaker: Dr. LO Chi Wai, Venue: Jasmine Room, Level 2, Royal Park Hotel, 8 Pak Hok Ting Street, Shatin	Ms. Ivy LEUNG Tel: 3189 8782 1 CME point

Date / Time	Function	Enquiry / Remarks
19 FRI 1:00 pm	**HKMA Kowloon City Community Network - Update Management on ACS Disease – Prevention and Treatment** Organiser: HKMA Kowloon City Community Network, Chairman: Dr. CHOI Wai Wan, Speaker: Dr. WONG Ming Ho, Danny, Venue: Spotlight Recreation Club (博藝會) 4/F., Screen World, Site 8, Whampoa Garden, Hunghom, Kowloon	Ms. Candice TONG Tel: 2527 8285
(20,21)	**HKMAPS Exhibition** Organiser: The Hong Kong Medical Association, Venue: Cultural Centre	Miss Nadia HO Tel: 2527 8285
21 SUN 2:00 pm	**HKMA Snooker Tournament 2013 (Day 1)** Organiser: The Hong Kong Medical Association, Venue: Prat Billiard Club	Ms. Dorothy KWOK Tel: 2527 8285
23 TUE 1:45 pm	**HKMA Tai Po Community Network - PDE5i Once Daily Dosing to Treat Erectile Dysfunction** Organiser: HKMA-Tai Po Community Network, Speaker: Dr. WONG Kwok Tin, Martin, Venue: Chiu Chow Garden, Shop 001-003, 1/F, Uptown Plaza, Tai Po, NT	Mr. Peter TSANG Tel: 2105 1622 1 CME point
25 THU 1:00 pm	**HKMA New Territories West Community Network - Paediatric Lower Limb Torsional Problems: Intoeing/ Outtoeing** Organiser: HKMA New Territories West Community Network, Chairman: Dr. HUEN Lok Lam, Speaker: Dr. PUN Kam Wa, Venue: Maxim's Palace Chinese Restaurant (美心皇宮), Tuen Mun Town Hall, 3 Tuen Hi Road, Tuen Mun	Miss Hana YEUNG Tel: 2527 8285 1 CME point
8:00 pm	**HKFMS Foundation Committee Meeting** 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	Ms. Nancy CHAN Tel: 2527 8898
26 FRI 1:00 pm	**HKMA Yau Tsim Mong Community Network - Diabetic Nephropathy Management 123** Organiser: HKMA Yau Tsim Mong Community Network, Chairman: Dr. LAM Tzit Yuen, David, Speaker: Dr. HO Chung Ping, MH, JP, Venue: Jade Ballroom, Level 2, Eaton Smart, Hong Kong380 Nathan Road, Kowloon	Ms. Candice TONG Tel: 2527 8285
1:00 pm	**HKMA Shatin Doctors Network - Improvement in Osteoporotic Management** Organiser: HKMA Shatin Doctors Network, Chairman: Dr. MAK Wing Kin, Speaker: Dr. YAU See Yun, Venue: Jasmine Room, Level 2, Royal Park Hotel, 8 Pak Hok Ting Street, Shatin	Ms. Ivy LEUNG Tel: 3189 8782 1 CME point
6:30 pm	**The 7th Annual Scientific Meeting – Enhancement and Removal of Memory** Organiser: Hong Kong Society of Biological Psychiatry, Chairman: Prof. TANG Siu Wa, Venue: Pearl & Jade Ballrooms, Eaton Smart Hong Kong, 380 Nathan Road, Kowloon	Ms Daisy NG Tel: 9658 9650
27 SAT 12:00 nn	**The 7th Annual Scientific Meeting – Enhancement and Removal of Memory** Organiser: Hong Kong Society of Biological Psychiatry, Chairman: Prof. TANG Siu Wa, Venue: Pearl & Jade Ballrooms, Eaton Smart Hong Kong, 380 Nathan Road, Kowloon	Ms Daisy NG Tel: 9658 9650
28 SUN 2:00 pm	**HKMA Snooker Tournament 2013 (Day 2)** Organiser: The Hong Kong Medical Association, Venue: Prat Billiard Club	Ms. Dorothy KWOK Tel: 2527 8285
30 TUE 1:00 pm	**HKMA Kowloon West Community Network - Paediatric Vaccines Update on Varicella & MMR Prevention** Organiser: HKMA Kowloon West Community Network, Chairman: Dr. CHAN Ching Pong, Speaker: Dr. CHEUNG Wai Yin, Eddie, Venue: Crystal Room I-III, 30/F., Panda Hotel, 3 Tsuen Wah Street, Tsuen Wan, NT	Miss Hana YEUNG Tel: 2527 8285 1 CME point
1:45 pm	**HKMA Tai Po Community Network - Symptom and Exacerbation Management in COPD** Organiser: HKMA Tai Po Community Network, Speaker: Dr. CHAN Hok Sum, Venue: Chiu Chow Garden, Shop 001-003, 1/F, Uptown Plaza, Tai Po, NT	Ms. Suki CHAN Tel: 8203 0219 1 CME point

Upcoming Meeting

16/6/2013	**Hong Kong Primary Care Conference** Organiser: The Hong Kong College of Family Physicians, Venue: HKAM Jocke Club Building, Enquiry: Ms. Crystal YUNG Tel: 2861 0220
10-13/7/2013	**9th Asian Dermatological Congress 2013** Organisers: Asian Dermatological Association, Hong Kong College of Dermatologists & the Hong Kong Society of Dermatology and Venereology, Chairman: Prof. Henry HL CHAN, Venue: Hong Kong Convention & Exhibition Centre, Enquiry: ADC 2013 Secretariat Tel: 3151 8900

Answers to Radiology Quiz

Findings:

XRay

- Right submandibular soft tissue swelling. Metallic dentures. Probable focal lucent changes at right periapical lower molar region. No aggressive periosteal reaction.

CT Neck

- Irregular rim-enhancing abscess at submandibular space extending from the root of right lower second premolar tooth.
- Abnormal lucency surrounding the root apex with widening of the periodontal ligament (PDL) space.
- Submandibular glands are unremarkable.
- Impression: Periapical odontogenic abscess with sinus through the mandible

Management:

- Consult Dental for tooth extraction, I&D abscess. Send pus for culture. Antibiotics.

Discussion[1]

The hallmark diagnostic findings of dental infection on CT scans include abnormal periapical lucency, loss in definition of the lamina dura, and widening of the PDL space. These findings may be considered in terms of the pathogenesis of periapical disease.

Periapical disease begins with dental caries, which are demonstrated on dental radiographs or CT scans as an abnormal area of lucency or defect in the crown of the tooth. From there, infection may spread to the pulp chamber. The pulp may become necrotic, thereby facilitating the spread of infection through the devitalised pulp chamber. Once the infection reaches the root apex, a periapical abscess or granuloma may form; such infection may be demonstrated on CT scans as abnormal lucency at the root apex. In normal teeth, the alveolus or tooth socket is delineated by a hyperattenuating line— that is, the lamina dura. The lamina dura, in turn, is separated from the radio-opaque tooth root by a thin area of lucency that represents the PDL space. In periapical disease, infection results in a loss of definition in the lamina dura and a widening of the PDL space. The PDL space is implicated in periapical disease. The PDL space, reported to measure normally between 0.15–0.38 mm, may widen at the site of infection. If there is further progression of the infection, the alveolus itself may become thin or develop a defect, and a subperiosteal abscess, which manifests as a rim-enhancing area of hypoattenuation in the adjacent soft tissues, may form.

Reference
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30 MG | 60 MG DELAYED RELEASE CAPSULES

- Sets a new standard for PPI therapy, with dual releases of active drug to provide significantly extended heartburn control[1,2]
- Effective across the spectrum of GERD[3,4]
- Maintains long-term healing and therefore quality of life[5,6]
- Lifestyle-friendly PPI : once daily, taken with or without food[1,7,8]
- Acceptable safety and tolerability profiles with minimal clopidogrel interaction[1,9]

For further information, consult full prescribing information.

Reference:1. Dexilant prescribing information (DEX051 HK1 1T, HK Branch). 2.Wittbrodt ET *et al.*, Clin Exp Gastroenterol 2009;2:117-28. 3. Fass R *et al.*, Ailment Pharmacol Ther 2009;29:1261-72. 4.Sharma P *et al.*, Ailment Pharmacol Ther 2009;29:731-41. 5. Metz DC *et al.*, Ailment Pharmacol Ther 2009;29:742-54. 6. Howden CW *et al.*, Ailment Pharmacol Ther 2008;30:835-67. 7. Lee RD *et al.*, Ailment Pharmacol Ther 2009;29:824-33. 8. Lee RD *et al.*, Ailment Pharmacol Ther 2010;31:1001-11. 9. Freilinger AL *et al.*, J Am Coll Cardiol 2012;59:1304-11

*96% of patient on Dexlansoprazole 60mg achieved 24-h heartburn-free days[6]

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