

THE UNIVERSITY OF HONG KONG

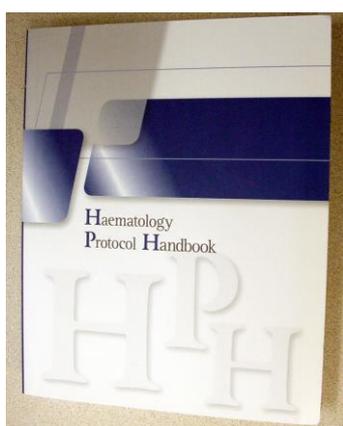
IMPACT CASE HISTORY

Title of Case Study

Multi-media Haematology Protocol: the Common Haematology Reference Platform for Doctors and Patients from around the World

1. Summary

To provide easily accessible, expert guidance for the treatment of blood cancers and diseases, Professor Yok-Lam Kwong and the Haematology Team of the Department of Medicine have developed the Multi-media Haematology Protocol, which is available as an iPad/iPhone application (<https://itunes.apple.com/us/app/haematology-protocol-summit/id550091470?mt=8>), through a dedicated website (<http://www.hpshk.com/>), and in book format.



This project offers both the first unified protocol in this field in Hong Kong and a new model of medical practice for Hong Kong, using online technology in the dissemination of medical management and treatment standards. The handbook and applications are available free to all practicing haematologists, oncologists, nurses and other interested doctors in Hong Kong. The website also makes the information readily available to patients and their families for reference. Furthermore, the quarterly newsletter from the

Division of Haematology and other regular updates on advances in haematology are published on the website and i-media app. This pioneering project, which is a combination of a unified protocol, sharing of knowledge and clinical experience as well as use of modern IT applications, has demonstrated an inspiring way to apply medicine, and serves as an excellent success model for workers engaged in health care and education.

2. Underpinning Research

The Division of Haematology of the HKU Department of Medicine has a long and distinguished track record of high quality service and research in haematology and haematological oncology, and is recognized as a leader in haematology locally and internationally. Professor Yok-Lam Kwong, Chui Fook-Chuen Professor in Molecular Medicine, is chief of the Division of Haematology, Medical Oncology and Bone Marrow Transplantation at the Department of Medicine. Specializing in haematology and haematopathology, he focuses on the management of haematological malignancies in his clinical work. His research centers on the molecular pathogenetic pathways and novel treatment modalities in haematological neoplasms. Professor Kwong is among the top 1% of scientists in the world (Essential Science Indicators, June 2013). Together with the clinical pharmacology team in his department, he has pioneered the development and use of oral arsenic trioxide in the treatment of acute promyelocytic leukemia and other blood cancers. The oral arsenic trioxide formulation has successfully secured patents in the United States of America and Japan. These patents are the first and only patents Hong Kong has ever obtained for a prescription medication. Oral arsenic trioxide is to be tested in large-scale studies in Europe through international collaborations. His research team is also actively involved in defining the molecular defects and optimal treatment protocols for T-cell and natural killer cell lymphomas, which are neoplasms prevalent in Asian populations. His team is widely regarded as one of the world opinion leaders in the treatment of T-cell and natural killer-cell malignancies. The team publishes many papers in top international journals every year. The body of excellent research that the team has built up underpins the successful Haematology Protocol launched in 2012.

3. References to the Research

Key peer-reviewed publications:

1. Au WY, Tam S, Fong BM, **Kwong YL**. Elemental arsenic entered the cerebrospinal fluid during oral arsenic trioxide treatment of meningeal relapse of acute promyelocytic leukemia. *Blood* 2006; 107(7):3012-3.

2. Siu CW, Au WY, Yung C, Kumana CR, Lau CP, **Kwong YL**, Tse HF. Effects of oral arsenic trioxide therapy on QT intervals in patients with acute promyelocytic leukemia: implications for long-term cardiac safety. *Blood* 2006; 108(1):103-6.
3. Wong AS, Chan KH, Cheng VC, Yuen KY, **Kwong YL**, Leung AY. Relationship of pretransplantation polyoma BK virus serologic findings and BK viral reactivation after hematopoietic stem cell transplantation. *Clin Infect Dis* 2007; 44(6):830-7.
4. Leung J, Pang A, Yuen WH, **Kwong YL**, Tse EW. Relationship of expression of aquaglyceroporin 9 with arsenic uptake and sensitivity in leukemia cells. *Blood* 2007; 109(2):740-6.
5. Au WY, Tam S, Fong BM, **Kwong YL**. Determinants of cerebrospinal fluid arsenic concentration in patients with acute promyelocytic leukemia on oral arsenic trioxide therapy. *Blood* 2008; 112(9):3587-90.
6. Au WY, Kumana CR, Lee HK, Lin SY, Liu H, Yeung DY, Lau JS, **Kwong YL**. Oral arsenic trioxide-based maintenance regimens for first complete remission of acute promyelocytic leukemia: a 10-year follow-up study. *Blood* 2011; 118(25):6535-43.
7. Yamaguchi M, **Kwong YL**, Kim WS, Maeda Y, Hashimoto C, Suh C, Izutsu K, Ishida F, Isobe Y, Sueoka E, Suzumiya J, Kodama T, Kimura H, Hyo R, Nakamura S, Oshimi K, Suzuki R. Phase II study of SMILE chemotherapy for newly diagnosed stage IV, relapsed, or refractory extranodal natural killer (NK)/T-cell lymphoma, nasal type: the NK-Cell Tumor Study Group study. *J Clin Oncol* 2011; 29(33):4410-6.
8. Man CH, Fung TK, Ho C, Han HH, Chow HC, Ma AC, Choi WW, Lok S, Cheung AM, Eaves C, **Kwong YL**, Leung AY. Sorafenib treatment of FLT3-ITD(+) acute myeloid leukemia: favorable initial outcome and mechanisms of subsequent nonresponsiveness associated with the emergence of a D835 mutation. *Blood* 2012; 119(22):5133-43.
9. **Kwong YL**, Kim WS, Lim ST, Kim SJ, Tang T, Tse E, Leung AY, Chim CS. SMILE for natural killer/T-cell lymphoma: analysis of safety and efficacy from the Asia Lymphoma Study Group. *Blood* 2012; 120(15):2973-80.
10. **Kwong YL**, Pang AW, Leung AY, Chim CS, Tse E. Quantification of circulating Epstein-Barr virus DNA in NK/T-cell lymphoma treated with the SMILE protocol: diagnostic and prognostic significance. *Leukemia* 2014; 28(4):865-70.

Patents:

1. Oral arsenic trioxide for treatment of leukaemia (US patent 7,521,071 B2)

2. Oral arsenic trioxide for treatment of leukaemia (Japan patent 4786341)

Selected external grant funding:

1. The role of Pin1 in tumour invasion and metastasis in hepatocellular carcinoma (HKU 767607M)

Funding Scheme:	General Research Fund
Principal Investigator:	Professor YL Kwong
Period:	2008-2010
Amount Awarded:	HK\$1,095,876

2. Provision of oral arsenic trioxide free to patients with cancers (206210)

Funding Scheme:	S.K. Yee Medical Foundation - General Award
Principal Investigator:	Professor YL Kwong
Period:	2008-2009
Amount Awarded:	HK\$410,000

3. Provision of ibritumomab for the treatment of Lymphoma (209210)

Funding Scheme:	S.K. Yee Medical Foundation - General Award
Principal Investigator:	Professor YL Kwong
Period:	2010-2013
Amount Awarded:	HK\$1,200,000

4. Provision of clofarabine for the treatment of relapsed or refractory acute leukaemia (210209)

Funding Scheme:	S.K. Yee Medical Foundation - General Award
Principal Investigator:	Professor YL Kwong
Period:	2010-2011
Amount Awarded:	HK\$600,000

5. Provision of bendamustine for the treatment of non-Hodgkin lymphoma and chronic lymphocytic leukemia (212208)

Funding Scheme:	S.K. Yee Medical Foundation - General Award
Principal Investigator:	Professor YL Kwong
Period:	2012-2015
Amount Awarded:	HK\$1,095,680

6. Provision of free azacitidine for high-risk patient with myelodysplastic syndrome (MDS) (213225)

Funding Scheme:	S.K. Yee Medical Foundation - General Award
Principal Investigator:	Professor YL Kwong
Period:	2014
Amount Awarded:	HK\$1,792,000

4. Details of the Impact or Benefit

The treatment of blood cancers and diseases is complex and difficult. These diseases are often life-threatening, require urgent treatment, and the medications used can be toxic and complicated to administer. Even specialists may find it challenging to manage patients well. On the other hand, research into blood cancers and diseases is constantly advancing and breakthroughs occur frequently. If haematology experts and doctors can share the latest advances and developments swiftly and in a highly accessible and easily updateable format, the benefits to patients will in turn be enormous.

Led by Professor Kwong, the Haematology team in the Department of Medicine drew together the latest expert advice and practices and launched the Multi-media Haematology Protocol in 2012, which is available as an iPad/iPhone application (<https://itunes.apple.com/tw/app/haematology-protocol-summit/id550091470?l=zh&mt=8>), through a dedicated website (<http://www.hpshk.com>), in book format, and comes with regular newsletters. The project offers both the first unified protocol in this field in Hong Kong and a new model of medical practice for Hong Kong.

This project is a landmark in medical practice in Hong Kong in that it is the first time that online technology has been harnessed in the dissemination of medical management and treatment standards. The handbook and applications are available free to all practicing haematologists, oncologists, nurses and other interested doctors in Hong Kong. They have given positive feedback on the materials to Professor Kwong and his team. Doctors can now get the most up to date information on investigation strategies and treatments and they can quickly reference drug dosage, drug administration and side effects. They can also get an idea of what is working or not in other hospitals in Hong Kong and adjust their approach.

Two years since its launch, the Protocol has been a big success and its reach has gone well beyond Hong Kong. It has become a common reference for blood disease management and acts as a platform for experts around the world to exchange information on the latest developments in the field.

The website has also become the go-to place for doctors overseas seeking information on the management of a certain type of lymphoma that is derived from natural killer cells, which mainly affects people of Asian and South American origin. Professor Kwong's team has received a lot of enquiries from doctors overseas seeking guidance on treating this kind of lymphoma.

The website is constantly updated. Recent updates include information on advances in the first-line treatment of metastatic colorectal cancer, the third most common cancer worldwide and also the third most common in Hong Kong, which was contributed to the site by Clinical Assistant Professor Dr Thomas Yau Chung-cheung, and the latest drugs for the management of venous thrombo-embolism by Clinical Associate Professor Dr Eric Tse Wai-choi. Furthermore, the quarterly newsletter from the Division of

Haematology and other regular updates on advances in haematology are published on the website and i-media app.

Patients suffering from blood diseases also benefit from the information accessible from the website and app, and the team has received questions emailed by patients. There is a lot of interest from Chinese patients living abroad. To make the Protocol even more accessible, translation of the various elements into Chinese is underway. An audio element will also be introduced this year: members of the team will create videos, in which they will talk about blood cancers and diseases in Cantonese, with Chinese subtitles available. A ‘chatbox’ to the website is being added so that people – whether they are doctors or patients – can send in questions and the team will answer them on line.

This pioneering project, which is a combination of a unified protocol, sharing of knowledge and clinical experience as well as use of modern IT applications, demonstrates an inspiring way to apply medicine and serves as an excellent success model for workers engaged in health care and education.

5. References to the Corroboration of Impact or Benefit

- Over 1,000 institutes and specialists have downloaded, subscribed or received the iPhone App / internet website / Protocol book.
- The Haematology team receives an enquiry from doctors overseas almost on a weekly basis.
- A search by the key words “haematology protocol” at Google or Yahoo will give the website of the Haematology Protocol (<http://www.hpshk.com>) at the top of the results.
- The launch of the Haematology Protocol in 2012 was extensively covered by the media.