Students in the Field:
A Rewarding Medical Internship – Documenting the Case of a Colorectal Cancer Patient with Hematochezia and Melena

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Background

During the summer of 2011, I was a medical intern at 463rd People’s Liberal Army (PLA) Hospital in China. The experience did not only challenge me academically, but it also helped me mature as a person. My beginning of this learning journey was filled with setbacks and criticism that disheartened me tremendously, to the point of fighting back tears on the bus ride home. But, as I learned to find motivation from criticism, prepare research information thoroughly to answer the doctors’ questions, and brighten the patients’ day with a genuine smile and a compassionate attitude, I began to earn the encouragement I previously had not deserved.

I was also able to follow the case of an anemic colorectal patient who had both hematochezia and melena. My role was to confirm melena without relying on a fecal blood occult test that was compromised due to a procedural mistake. The task required me to integrate my research information to realize how medication could be confounded with disease symptom. Specifically, I was required to discern the black tarry stool of melena from the dark greenish black stool caused by iron supplement treatment.

Looking back two years, those seemingly impossible obstacles were just small hurdles compared with what I need to prepare myself for in the future. Obstacles test my ability to understand, apply, analyse, evaluate, and most importantly—create. Obstacles make my life eventful, for I certainly do not intend for it to be as smooth as a straight line on an electrocardiogram.

Rewarding Medical Internship – Perseverance, Advocacy, Learning, and Growth

The Beginning of a Learning Experience

During the summer months from May 15, 2011 to August 15, 2011, I had the golden opportunity to be a medical intern at China’s 463rd People’s Liberal Army (PLA) Hospital. I interned at the departments of Special Diagnosis, Neurology, and Cardiology. The experience was an impetus to both academic growth and personal maturity. It allowed me to contribute back to a society that has fostered the beginning twelve years of my life. It gave me a chance to learn how to find motivation from criticism. It humbled me to be inspired by patients who refuse to let their disease cripple their integrity. And it permitted me to advocate for the enthusiasm and responsibility of being a global citizen.

I was offered this opportunity after I had volunteered at the Special Diagnosis Department of the 463rd PLA Hospital for two months during the summer of 2008. It was an exciting and unnerving thought to be a medical intern – it would be my first time working in the real world, let alone with doctors, the very people I aspire to be.

The Standards and Training

The 463rd PLA Hospital is a national tier-three A-level hospital, stationed at Shenyang, Liaoning, in northeastern China. Adhering to the Hospital’s rules and regulations, all of my roles, from performing electrocardiograms (ECG) to explaining the results to
patients, were performed under direct supervision of an attending physician (or a medical resident) who assessed me for consistency and accuracy. Some of my additional roles include measuring blood sugar levels and blood pressures, researching and learning about the patient’s conditions, and observing ultrasound biopsies.

My first station was Special Diagnosis, which receives the highest flux of in-patient examinations every day because it is primarily concerned with performing (ECG’s) and observing focused ultrasounds, which are both essential techniques to diagnosis. I received ECG training on my first day about the correct placement of electrodes, electrical events associated with each wave, and the normal form of ECG. My supervisor, Dr. Chen, was thorough, supportive, but also critical of my mistakes. Similar training procedures occurred at Neurology and Cardiology, where I was taught by my supervisors in measuring blood pressures with a sphygmomanometer and collecting blood sugar levels with a portable glucose meter.

**Embrace Criticism to Persevere**

During the first week, nothing dispirited me more than the overwhelming disapproval from my superiors and patients. Since it was my first time applying techniques hands-on in a very demanding environment, I was anxious and uncertain with even the most basic procedures. I constantly feared that I would misplace the ECG electrodes on the patient, and hence causing a misdiagnosis from a faulty ECG. I desired to impress my supervisors, but I was frustratingly incapacitated before I began. I left the hospital disheartened because the staggering amount of criticism made me feel that I was too incompetent to be a physician.

But I was determined to conquer setbacks. Negative experiences can make you feel vulnerable, but more so they make you resilient to hardships. I learned to channel discouraging criticism into motivation by reminding myself to like the person who bothered to give honest feedback. I worked on improving my performance and re-gaining confidence rather than to dwell in the anger of criticism. Finally, after weeks, I earned a whole-hearted compliment from a patient when I was able to explain what his electrocardiogram meant. He smiled at me and I know I have persevered.

**Interacting with Doctors – Self-directed Learning**

Researching patients’ conditions was a crucial part of learning that I enjoyed during my breaks. Like you see on Grey’s Anatomy, my supervisors tested me, but they did not teach me. I made the mistake of asking my supervisors about a disease that I had not researched, expecting them to teach me. What I received was an awakening scolding of how ungrateful I was to expect out of others what I did not expect of myself. Thereafter, I directed myself to study the symptoms, molecular abnormalities, medical tests, and how to differentiate from similar diseases.

I improved my interactions with doctors and patients by preparing thoroughly for them. I researched the patients’ conditions beforehand, asked doctors only thoughtful questions, and thanked patients for being supportive.

**Inspirational Patients**

I had much to learn from my patients – they were courageous, compassionate, and full of life. I once saw an Alzheimer’s patient with considerable memory loss telling his wife of more than 40 years how much he liked her. I owed it to them to dedicate my every effort.

Eventually, after persevering through the criticism, patients in Cardiology nicknamed me the “little Canadian swallow.” I unknowingly became a cultural ambassador in my homeland. I felt rewarded, but more so humbled to have spread around the contagious Canadian enthusiasm.

**Why do I want to be a doctor?**

The experience added new depths to why I want to pursue medicine. I want to contribute to society the same way it has fostered me through education and participation. But a person can contribute to society and save lives with almost every job; police officers and firefighters are just two of the many examples that are essential to our society. But pursuing medicine is an intimate choice, one that has evolved over 20 years of life.
Maybe the goal of becoming a physician originally began with a passion for the intricate molecular pathways of pathology. Maybe I felt guilty that I did not spend as much time with my grandpa before he was taken away by disease.

But, as I stand now, I want to be a doctor because medicine is enticing. It is thrilling to be immersed in the totality of the career—from gaining the knowledge, collaborating with others, being inspired by the patients, and understanding humanity. I want to choose medicine for the same reason a person would choose any career—I will persevere, I will excel, and most importantly, I will enjoy it!

**Rewarding Medical Internship – Documenting the Case of a Colorectal Cancer Patient with Hematochezia and Melena**

The diagnostic, discovery, and treatment procedures of Patient L were documented over the course of June 18–August 1, 2011, at the Neurology Department of the 463rd People’s Liberal Army (PLA) Hospital in China. Permission to report patient profile for academic purposes was granted from Patient L’s family and the medical staff at the 463rd PLA Hospital.

Patient L was a 90 year-old male, bed-ridden, and suffering from advanced stage of Alzheimer’s Disease. He had a history of intracerebral infarctions. He was also placed on nasogastric feeding.

**Colorectal Cancer – Hematochezia and its Treatment**

Patient L had been recently diagnosed colorectal cancer from a tumor approximately 2 cm in diameter 15 cm proximal to the anal sphincter. Since blood vessels were damaged by tumor growth, Patient L had hematochezia (lower GI tract hemorrhage) of 30 mL on average per day on a period of 3-5 days, over a cycle of 14-15 days.

Hematochezia is a prominent symptom of colorectal cancer that leaves distinct, bright red-colored blood in a patient’s stool, which is easily distinguishable from discoloration of the stool caused by medication, for example, iron supplements.¹

Meanwhile, a blood test showing abnormally low hemoglobin concentration of 9.0 g/dL (compared with normal values of 12.0-16.0 g/dL) indicated anemia.² Patient L’s doctor, Dr. Wang, prescribed polysaccharide iron complex (PIC) as an iron supplement to treat Patient L’s anemia.

Considering the history of intracerebral infarctions, Dr. Wang decided against using coagulant to treat hematochezia in fear it may cause an embolism. Hence, soluble haemostatic gauze, which quickly absorbs blood and body fluid to form a gelatinous mass, was used to avoid increasing the risk of embolism.³ Using 4 X 2 g of gauze per day was successful in reducing all signs of visible fecal blood (a fecal occult blood test was not performed).

**The Emergency and Melena**

Strangely after nearly a month of treatment, Patient L’s hemoglobin had gradually decreased to 8.0 g/dL without any visible bleeding. Hematochezia was eliminated as the potential cause because it was controlled. On July 20th, five days after the blood test, the medical team was alerted when Patient L had an acute flow of dark blood (appeared brighter near the end because it was acute bleeding) and blood clots in the stool (estimated to have been 225-250 mL of visible blood). We reacted immediately by giving Patient L a transfusion of 400 mL of blood to prevent hypovolemia, a loss of blood volume.⁴ It was also able to raise Patient L’s hemoglobin from 7.5 g/dL (after acute bleeding) to 7.8 g/dL.

Having seen the flow of a large quantity of dark blood and blood clots in the stool, it became strongly convincing that Patient L had melena, or upper GI hemorrhage. It made sense now that the gradual decrease of hemoglobin to 8.0 g/dL was probably caused by occult, chronic bleeding from the upper GI that eventually became acute.

Unlike hematochezia, melena produces dark blood because the blood has been present in the body for >8 hr to allow for enzymatic oxidation of iron molecules in
hemoglobin as the blood passes through the intestines\(^5\). The oxidized blood is responsible for producing the black tarry stool, a sign that can be attributed to melena almost immediately\(^5\).

Melena could be a sign of lower GI bleeding had the tumor been in the caecum instead of the rectum. It was rare that the cancer metastasized to the stomach.\(^6\) Therefore, the development of melena suggested a problem other than colorectal cancer.

**My Role in Helping to Confirm Melena**

I was tasked with finding how melena could have occurred. Melena was not recorded in Patient L’s files, so it would not have been fruitful to ask directly. The trick is to find historical causes of melena.\(^4\) My research showed that melena can be caused by erosive esophagitis, and most commonly, peptic ulcers\(^7\). Both of these were confirmed to have occurred nearly 20 years ago by Dr. Wang during his interview with Patient L’s family. Trauma (bleeding) from inserting nasogastric feeding catheters, a history of peptic ulcer, combined with a lack of monitoring for the recurrence of ulcers could have exacerbated the condition to melena.

Furthermore, Dr. Wang tested to see if I could apply critical thinking skills to identify melena without relying on a fecal occult blood test she ordered earlier.

Through analyzing my research information, I found that fecal discoloration by iron supplements (e.g. PIC) can be confounded with the black tarry stool of melena. Unlike hematochezia, the black tarry stool of melena is easily disguised by effects of PIC (and iron supplements), which turn the stool to a greenish black.\(^1\)

Hence, to discern melena from discoloration of the stool caused by PIC, I told Dr. Wang the plan should consist of pausing PIC treatment to eliminate the confounding effect. I knew that medication is normally eliminated 12-72 hr following ingestion, so fecal discoloration should also disappear if PIC intake was paused to prevent it from obscuring melena.

On the fourth day after pausing PIC treatment, Patient L’s stool remained black rather than returning to the normal medium brown, indicating it was melena.

Results of the fecal occult blood test were not meaningful because PIC treatment must be paused for 3 days as part of the proper preparation.\(^8\) Otherwise, the amount of iron would have been overestimated.

**On a Brighter Ending**

After consulting with the Hematology Department at the hospital, Dr. Wang began treating patient L with coagulant prothrombin complex concentrate (PCC) at 1000 IU, four times a day. PCC is a combination of blood clotting factors II, VII, IX, X, and protein C and S.\(^9\) It is used in cases of severe hemorrhage (including GI hemorrhage).\(^9\) After 3 days of PCC treatment, patient L’s stool returned to a normal medium brown color. Patient L received another 200 mL of blood transfusion. His hemoglobin was in the 7.8-7.9 g/dL range until Aug.1, the end of my studies.

I learned from this case that it is extremely important to evaluate available information from multiple perspectives. We made the mistake of not realizing how the discoloration effects of PIC could have disguised melena. We apologized to Patient L’s family for not having suspected melena sooner, which could have prevented the emergency bleeding. Paying attention to details is a skill in medicine, for I certainly did not know how treatment can impede diagnosis.

In the end, we were able to manage a major acute GI hemorrhage with immediate transfusion, diagnosis of melena from a combination of resources, and fast control of melena. It had been a truly fulfilling experience – it allowed me to be self-critical about my mistakes and learn a memorable lesson from it.

**Acknowledgements**

I would like to acknowledge and extend my heartfelt gratitude to the following persons who have made the completion of this case study possible: Patient L and his family, for their vital cooperation and support, Dr. Wang, for her sincere encouragement and assistance.
References


Supplementary

A complete diagnosis for hematochezia with colonoscopy, and melena with esophagastroduodenoscopy (EGD), would have been required to pinpoint the exact location of the bleeding. However, they were not performed due to the invasive and painful nature of the procedures. It may not have been necessary to know the exact location of upper GI tract bleeding because treating melena with PCC was able to return Patient L’s stool color to normal after 3 days. It was uncertain what the cause of peptic ulcer was, but Patient L did not have H. pylori infections, nor was he given pain relief medication regularly. Patient L’s family politely refused any treatment of the tumour as they preferred to pursue comfort measures only.