



H&P

The Stanford Medical Student Journal

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A Day in the Life
Five Doctors, Five Days

Contents

- 3 Editors' Note
- 4 Herlyn-Werner-Wunderlich Syndrome: A Triad of Uterine Didelphys, Obstructed Hemivagina, and Ipsilateral Renal Agenesis
Josephine Czechowicz, Judith Lacy
- 8 Working up Pediatric Hypoglycemia: A Case of Ketotic Hypoglycemia
Yannis M. Paulus, Sangeeta Schroeder

- 12 Editorial:
The Fiery Debate Over Children's Health
Steven Lin

A Day in the Life

- 14 Puzzle Pieces of Infection:
Dr. Andrew Nevins, Infectious Diseases
Michael Sundberg
- 16 Operating under Pressure:
Dr. John Morton, General Surgery
Gavitt Woodard
- 18 Listening to Kids:
Dr. Shashank Joshi, Child Psychiatry
Chantal Forfota
- 20 Putting out the Midnight Fires:
Dr. Matt Strehlow, Emergency Medicine
Jeremiah Ray
- 22 Making a Hepatoportoenterostomy Look Like Child's Play:
Dr. Sanjeev Dutta, Pediatric Surgery
Blake Charlton
- 24 Composed Upon a Syllabus
Alana Frost
- 25 Girl
Ariel Williams
- 26 Homelade
Dona Tversky
- 28 My Summer in the Tenderloin
Elsie Gyang
- 30 An Interview with Dr. Thomas Krummel
Sean Sachdev

clinical case reports

ethics

features

humanities

leaders in medicine

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Front/Rear Photos:
Phuongvi Nguyen, Christina Chao

Editors' Note

As part of the "Procedures" course for second-year medical students, I recently did my first shift in the Emergency Department. An 87-year-old woman with white hair and bright brown eyes was admitted for syncope. I barely heard her story, being intently focused on her frail left arm and looking for a good, bouncy vein. After several tries, I started her IV and felt like I'd just performed brain surgery.

Then the patient said to me, *Jenna, is that you?* She was a bit disoriented and thought I was her daughter. I suddenly remembered this was a human being in front of me. I asked her a few questions and learned that she has a dog, named Robert Benson, and that she used to dance with the San Francisco Ballet. Then her heart stopped, for about three seconds. I watched the line go flat, and then begin to pulse again.

I was reminded again of the art of medicine, to which this journal, and our entire medical education at Stanford, is dedicated. The art of medicine is a question of balance. We must learn how to do procedures with a steady hand and a dispassionate, objective mind, yet also be able to respond to our patients as human beings with attentiveness, empathy, and sometimes awe.

One of the advantages of being a green preclinical student is that we retain that sense of awe. We see the workings of the hospital with fresh, observant eyes. In the *Features* section of this *H&P* issue, 'A Day in the Life,' five preclinical students shadow five seasoned attending physicians for one day and report on the events of the day with the sharpened senses of a novice. Mike Sundberg reflects on the diagnostic challenges of Infectious Disease, shadowing Dr. Andrew Nevins. Gavitt Woodard looks on as Dr. John Morton performs bariatric surgery, dramatically improving the lives of his patients. I had the pleasure of accompanying Dr. Shashank Joshi for one very full day in Child and Adolescent Psychiatry. Jeremiah Ray reports on the fast-paced world of Dr. Matt Strehlow in Emergency Medicine. And finally, Blake Charlton observes the minute theater of operation of Dr. Sanjeev Dutta in Pediatric Surgery.

'A Day in the Life' encompasses the medical experience outside the hospital as well. Elsie Gyang's reflection on her summer as a public policy intern for the Mental Health Association describes her experience

in the Tenderloin district of San Francisco. Steven Lin brings to our pages the debate regarding SCHIP coverage being waged both in Washington, D.C., and at local rallies held by pediatricians.

With this edition, we inaugurate a new section of *H&P*, 'Leaders in Medicine.' Our hope is to showcase some of the innumerable Stanford faculty who have made significant contributions to medicine and serve as role models to individuals at all stages of training. Sean Sachdev launches this section with an interview with pediatric surgeon Dr. Thomas Krummel, who is one of the pioneers of ECMO – extracorporeal membrane oxygenation.

Josephine Czechowicz and Yannis Paulus present clinical case reports from their first few months of clerkships. Czechowicz focuses on Herlyn-Werner-Wunderlich Syndrome, a rare constellation of findings that includes uterine didelphys, while Paulus presents a pediatric work-up of ketotic hypoglycemia.

A correction to the Summer 2007 issue of *H&P*: the feature article, "Doctors in the Media," was mistakenly attributed to Lizzy Goldsmith. Rebecca Hjorten was the actual author. Our apologies, Rebecca!

We would like to thank other contributors to this issue of *H&P*, the photography staff, Anna Lonyai and Jon Kleinman, and for her help in layout, Judy Yeh. We also thank Jamie Colbert and Thomas Tsai for their incredible leadership last year and are glad for their continued support as senior editors of *H&P*.

In his essay, "Doctor, Talk to Me," literary critic Anatole Broyard states that he would like a doctor who is a close reader of illness and a good critic of medicine; a doctor who is a talented physician and a bit of a metaphysician as well, who can treat body and soul. We hope that *H&P* continues to provide a place to read illness in its larger humanistic context, and a forum for reflection on the practice and art of medicine.

Chantal Forfota
Malavika Prabhu

The title H&P reflects the importance of the basic history and physical examination in clinical medicine in every corner of the world. It also represents Hygeia and Panacea, two daughters of Asclepius. In Greek mythology, Hygeia is the goddess of welfare and the prevention of sickness, while Panacea is the goddess of healing and cures. We believe that these figures represent the two facets of our medical education – to treat and cure illnesses while promoting the welfare of our patients by preventing disease. The title H&P also reflects our interest in the metaphors of medicine. What an illness means to a patient may be as important as the diagnosis itself, and a practitioner of the art of medicine attends to each of these meanings.

Herlyn-Werner-Wunderlich Syndrome: A Triad of Uterine Didelphys, Obstructed Hemivagina, and Ipsilateral Renal Agenesis

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ABSTRACT

Uterine didelphys, obstructed hemivagina, and ipsilateral renal agenesis, known as the Herlyn-Werner-Wunderlich (HWW) Syndrome, is a constellation of congenital anomalies of the urogenital tract involving both Mullerian and vestigial Wolffian structures. Presentation is notoriously variable, but the typical patient presents with worsening pelvic pain, dysmenorrhea, and a palpable pelvic mass. The mass is attributable to retained menstrual tissue and clotted blood in the vagina (hematocolpos), as well as the uterus (hematometra). Diagnosis is based upon a thorough history, physical examination, and imaging studies. Needle aspiration drainage of any fluid collection should not be attempted as it is not efficacious and undoubtedly increases the risk of infection. Surgical resection of the vaginal septum allows for drainage of the hematocolpos and hematometra, preventing possible sequelae such as pelvic infection or retrograde endometriosis. Fertility outcomes in women post-operatively are comparable to those in women with uterine didelphys alone but are significantly lower than in women with normal uterine anatomy.

Introduction

Congenital anomalies of the female urogenital tract are relatively common, occurring in an estimated 1-3% of women. [1] These anomalies arise due to abnormal development of the Mullerian (paramesonephric) and vestigial structures of the Wolffian (mesonephric) ducts and tubules. During typical female development (in the absence of Mullerian Inhibiting Substance), the Mullerian ducts grow medially and caudally, eventually fusing to form the uterus, fallopian tubes, and upper portion of the vagina. The Wolffian ducts induce local mesoderm to develop into renal parenchyma, and the ducts themselves become the urinary collecting system. The absence of testosterone prevents the development of male reproductive structures. Due to the physical proximity and timing of development of these structures during embryogenesis, anomalies involving the Mullerian ducts often also involve Wolffian structures, and vice versa.

One such abnormality that involves both Mullerian and Wolffian structures is the constellation of uterine didelphys, obstructed hemivagina, and ipsilateral renal agenesis or Herlyn-Werner-Wunderlich Syndrome (Figure 1). [2] Uterine didelphys occurs when the Mullerian ducts fail to laterally fuse, producing two separate uteri, each with a cervix (bicollis). Approximately 75% of cases of uterine didelphys also have a septated vagina. Of those, 15-20% have unilateral anomalies such as a longitudinal vaginal septum

that deviates laterally resulting in an obstructed hemivagina and unilateral renal agenesis. [3] Uterine didelphys and obstructed hemivagina can be seen without renal agenesis, but when present, a longitudinal vaginal septum deviating to the side of the absent kidney is almost invariably seen. Current research suggests that HWW may be caused by early damage to a caudal portion of one of the Wolffian ducts, simultaneously preventing kidney development and interfering with Mullerian fusion. However, a definitive answer on the developmental etiology of HWW remains to be seen. [4]

Presentation of HWW is frequently deceptive, but patients typically present with worsening abdomino-pelvic pain, dysmenorrhea, and a pelvic mass. [5] Accurate diagnosis is crucial to avoid incongruous treatment. Early diagnosis and surgical intervention is also important to reduce pain and to prevent potential retrograde endometriosis (reflux of endometrial tissue through the fallopian tubes into the abdominal cavity) or pelvic infection.

Case Report

Patient 1:

A 17-year-old female presented to the emergency department (ED) on June 15, 2007, complaining of severe abdomino-pelvic pain. The patient denied any recent abdomi-

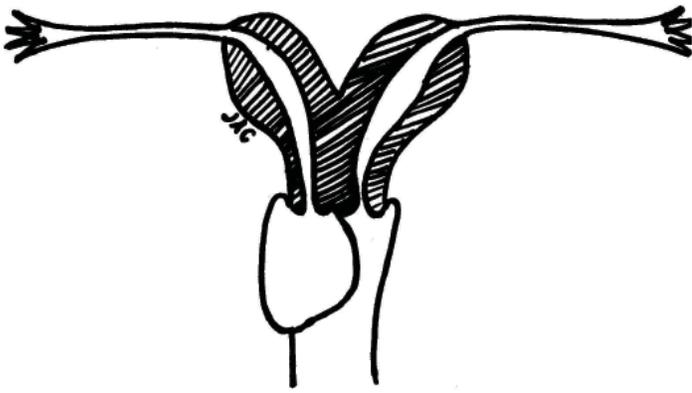


Figure 1: Uterine didelphys with obstructed hemi-vagina.

nal trauma, abnormal vaginal bleeding, nausea, vomiting, or diarrhea. Physical exam was significant for a right-sided pelvic mass. Gynecologic history was significant for menarche at age 13, followed by 4 years of irregular menses. She denied any history of sexual activity, alcohol, tobacco, or drug use. The patient was not taking any medications when she presented to the ED, and her complete blood count was within normal limits. Bedside transabdominal ultrasound of the abdomen and pelvis showed a large, complex, fluid-filled pelvic mass measuring 17 cm x 13 cm. Subsequent MRI revealed uterine didelphys, a sagittal vaginal septum obstructing drainage from the right uterus and vagina, and a 12.8 cm fluid collection within the right vagina presumed to be a hematocolpos. Also notable was the finding of a solitary left kidney with mild hydronephrosis and compensatory hypertrophy.

One week later, transvaginal ultrasound-guided drainage of the hematocolpos was attempted using fine needle aspiration. The procedure was unsuccessful as the hematocolpos fluid was too thick to aspirate. The patient was placed on prophylactic antibiotics for 7 days and was referred for further evaluation. At this visit, the patient reported continuous vaginal discharge of clotted blood-like material since the attempted drainage procedure. The patient was started on combined oral contraceptive pills for menstrual suppression until surgical intervention was performed.

A vaginal septum resection followed by drainage of the hematocolpos and hematometra was performed under general anesthesia 10 days later. Upon incision of the septum, approximately 50 ml of purulent material was aspirated, followed by 500 ml of thick hematocolpos. After drainage, irrigation, and attainment of hemostasis, speculum and bimanual exams revealed two cervixes corresponding with each uterine horn. The patient was prescribed ibuprofen and vicodin for pain relief, and vaginal premarin cream to promote healing of the vaginal tissue.

At a follow-up visit two weeks post-operation, the patient had healed well. Physical exam showed no bleeding or erythema, an intact suture line, and patency of the resected right hemivaginal septum. The patient had no complaints of pain and was back to her normal activity level.

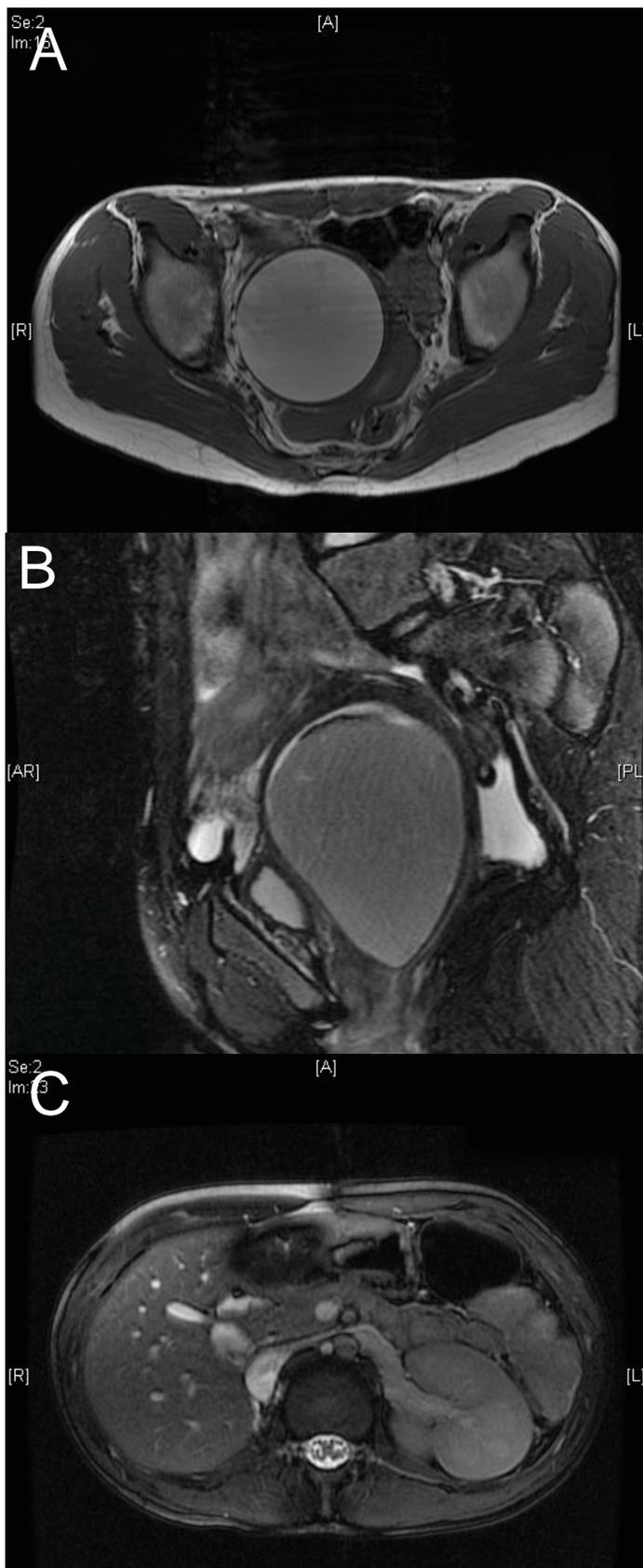
Patient 2:

A 14-year-old female presented to the ED on July 6, 2007, with severe abdominal pain, later diagnosed as this same rare syndrome. She reported that the pain had begun in February and had worsened over the subsequent six months. The pain was worse immediately prior to menstruation and then improved once menstrual flow began. The patient also reported worsening constipation. She denied problems with urination, nausea, vomiting, or diarrhea. The patient underwent menarche in February of 2007. Her menses occur every 28-30 days with three to four days of light-to-moderate flow. Physical exam and subsequent ultrasound revealed a 12 cm x 8 cm pelvic mass. The mass was thought to be in the adnexal region, and she was taken to the operating room for diagnostic laparoscopy and possible ovarian or paratubal cystectomy. This procedure revealed the diagnosis of uterine didelphys with a large right-sided hematocolpos. Based upon this information, the patient was referred to a pediatric and adolescent gynecologist for consultation. Three weeks later, an abdominal and pelvic MRI confirmed the diagnosis of uterine didelphys with double cervixes and right-sided obstructed hemivagina. The study also revealed a large right-sided hematocolpos and an absent right kidney (Figure 2). Surgical resection of the obstructing vaginal septum was performed in the same manner as described in the case of Patient 1. The patient had returned to her normal activity level two weeks after and reported no pain and improvement of constipation symptoms.

Discussion

The recommended course of diagnosis and treatment for a patient presenting with the HWW syndrome includes a thorough history, physical examination, and diagnostic imaging. [6] Because these patients have obstructed vaginal outflow, they are at risk of endometrial tissue reflux through the fallopian tube, which can result in retrograde endometriosis. Some surgeons favor diagnostic laparoscopy at the time of vaginal septum resection to evaluate for and treat any potential endometriosis. [7] However, due to the unnecessary risk of an additional surgical procedure, most favor conservative management without laparoscopy. Anecdotal reports have suggested there is sufficient resolution of retrograde endometriosis following resection of the obstructing vaginal septum. [8]

Following confirmation of the diagnosis, drainage of the hematocolpos and surgical resection of the vaginal septum should be performed to reduce pelvic pain, lower the risk of infection, and prevent further hematometra. If surgery is not an immediate option, menstrual suppression with combined oral contraceptive pills is advised to prevent further accumulation of hematocolpos and further hematometra. The major sequelae from failure to treat this condition include urinary retention, hematosalpinx (blood in the fallopian tube), endometriosis, and ruptured tubo-ovarian abscess. [9] [10] Under no circumstances should needle-guided aspiration drainage of the hematocolpos be



attempted. The consistency of the hematocolpos is almost always too thick to be aspirated through even a large-gauge needle. Moreover, perforation of the vaginal septum can introduce bacteria, potentially resulting in a fulminant pelvic infection. The finding of pus during surgical drainage of the hematocolpos of Patient 1 provides evidence that bacteria introduced by aspiration can cause infection. Fortunately, surgical intervention was performed before this infection caused significant morbidity.

Vaginal septum resection is typically performed vaginally. Hymenectomy is not required nor recommended prior to vaginal septum resection as the estrogenized tissue often stretches, allowing a vaginal approach. Several reports on hysteroscopically-guided resections have been described in which the integrity of the hymen was maintained. [11] In either case, it has been shown to be essential to resect a sufficient amount of vaginal tissue, as simply incising the septum often results in re-healing of the wound and re-obstruction of outflow. Usually, upon removal of the hematocolpos, the distended uterus contracts down to normal size, preventing the reformation of hematocolpos. However, one case has been described in the literature in which the distended uterus did not contract and the hematocolpos reaccumulated despite vaginal patency. This patient was ultimately treated with removal of the hemi-uterus.

Patients with uterine didelphys are capable of carrying pregnancies to term. However, they are at higher risk for spontaneous abortion (32.2% of pregnancies), preterm delivery (28.3% of pregnancies), and their overall live birth rate is only 55.9%. [12] Historically, women with uterine didelphys who experienced recurrent pregnancy loss or preterm delivery would often undergo a metroplasty procedure (joining of the two uterine cavities). One study showed an increase in the live birth rate to 80% after this procedure; however, this outcome improvement is controversial and the technique is no longer routinely practiced. [13] Conservative management is the current recommendation. [14]

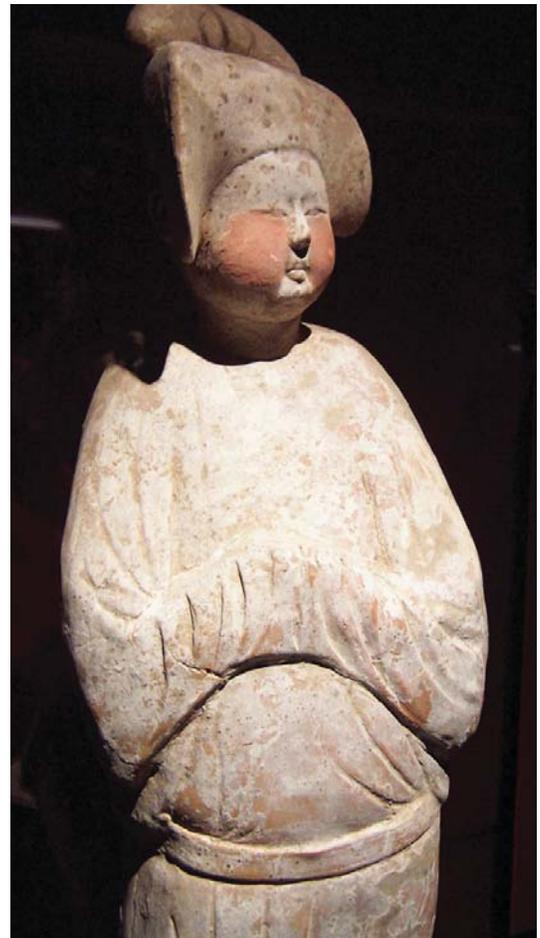
Figure 2: Non-contrast MRI of Abdomen and Pelvis, Patient 2
 A. Transverse view of pelvis. A 12 cm x 8 cm x 8 cm hematocolpos occupies the right uterus and hemivagina.
 B. Parasagittal view of abdomen and pelvis. The hematocolpos distends the right uterus vertically to the level of the umbilicus.
 C. Transverse view of abdomen. Agensis of the right kidney with compensatory hypertrophy of the left kidney can be appreciated.

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Ricky Tong



Shaundra Eichstadt

Working up Pediatric Hypoglycemia: A Case of Ketotic Hypoglycemia

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ABSTRACT

Hypoglycemia in adults can be caused by a myriad of conditions but most often arises from drugs used to treat diabetes. In children, while ingestion is still a frequent cause of hypoglycemia, the differential also includes inherited enzymatic defects, congenital hyperinsulinism, and transient intolerance of fasting. Here we present a case of one of the more common causes of childhood hypoglycemia, ketotic hypoglycemia. Our patient is a five year-old female with a history of autism who presents to the ER with nausea, vomiting, sweet-smelling breath, and hypoglycemia to 47 mg/dL. She has had five prior episodes resulting in two prior hospitalizations. A discussion of the presentation, work-up, and treatment of ketotic hypoglycemia is described.

Introduction

Glucose homeostasis involves a complex balance between the anabolic and catabolic functions of the body. The endocrine system, metabolic enzymes for glucose catabolism and anabolism, and endogenous energy stores all play a major role in blood glucose concentration. Adult glucose homeostasis appears to be much more robust at preventing episodes of hypoglycemia even in prolonged fasting states.[1] In adults, glucose imbalance most often appears as hyperglycemia associated with type 2 diabetes.

Children, however, have a much less robust glucose homeostatic regulation and are more likely to have episodes of hypoglycemia secondary to inadequate nutrition. [2] Glucose requirements increase in a linear fashion during the first 10 years of life followed by a plateau phase and eventual normal adult utilization. [3] Children have a rate of glucose utilization approximately three times that of adults both during short and prolonged fasting periods. [4-6] This, combined with the presentation of metabolic deficiencies throughout childhood, results in a myriad of hypoglycemic episodes.

Case Report

A five-year-old female in her usual state of health presented with four days of nonbloody, nonbilious emesis. Emesis began upon returning home after a vigorous dance class without having recently eaten a meal. She visited Urgent Care three days prior to admission, at which time the nausea seemed to resolve. She was able to tolerate oral intake and was sent home. She then presented to the ER two days prior to admission with worsening vomiting and decreased oral intake and was found to have a glucose level of 47 mg/dL. Following administration of IV dextrose and anti-emetics, she was again tolerating oral fluids and was discharged from the ER. This time, however, prior to

discharge, a critical lab sample was obtained (See Table 1 for critical labs). The patient continued to have vomiting, increased irritability, decreased energy, and decreased oral intake at home; she once again returned to the hospital and was subsequently admitted for further evaluation.

On further questioning, the family also noted a sweet smell on her breath. The family denied any associated diarrhea, fever, rashes, nasal discharge, breathing difficulties, or chest pain. The family also reported five prior episodes of similar emesis with sweet-smelling breath all occurring in the past two years. This resulted in two prior hospitalizations for vomiting and hypoglycemia. During

Table 1: Critical Labs to Evaluate Hypoglycemia

Basic Metabolic Panel
Serum insulin
Beta-hydroxybutyrate (Serum ketones)
Growth Hormone
Cortisol
Free fatty acids
Ammonia
IGFBP-1
C-peptide
Plasma amino acids
UA (for ketones)
Urine organic acids
Plasma acylcarnitine profile
Newborn screen
Lactate
ABG (only if patient is toxic/severely ill appearing)

Table 2: ER Presentation Labs						
Lab	Pt's value	Normal range		Lab	Pt's value	Normal range
Na	131	135-145 mmol/L		Ammonia	19	<30 umol/L
K	5	3.5-5.5 mmol/L		Total protein	7.1	6-7.8 g/dL
Cl	95	96-109 mmol/L		Albumin	4.3	3.5-5.5 g/dL
HCO ₃	14	20-30 mmol/L		Total bilirubin	0.8	0.1-1 mg/dL
BUN	19	5-18 mg/dL		Direct bilirubin	0.1	0-0.3 mg/dL
Creatinine	0.6	<0.8 mg/dL		AST	57	2-50 IU/L
Glucose	47	70-100 mg/dL		ALT	38	20-60 IU/L
Cortisol	14.5	4-26 mcg/dL		Alk Phos	228	20-70 IU/L
Insulin	4	0-180 pmol/L		Lactic acid	1.6	<3 mmol/L
Growth Hormone	52.4	<6 ng/mL				

both prior hospitalizations, the patient was given intravenous fluids for hydration and discharged home without further workup.

Past medical history is significant for autism, diagnosed at two years of age and treated well with in-house care. Birth history indicates a full-term C-section secondary to failure to progress and non-reassuring fetal heartbeats. There were no further complications with the pregnancy, labor, or delivery. The patient displayed some food refusal behavior at two years of age and is noted to be a picky eater without any preference for certain textures or kinds of foods. She fell off her growth curve between 6 months and 18 months of age but has progressed along the 8th to 10th percentile since 18 months of age. The parents report the patient has a severe egg allergy resulting in facial edema for which she has an Epi-Pen that has never been used. The parents also report a rash from amoxicillin. Family history is significant only for chronic intestinal pseudo-obstruction in a paternal first cousin with no prior known family history of metabolic disorders or hypoglycemia and no history of consanguinity.

On admission, patient's weight was 16.6 kg (8th percentile) and height was 111.3 cm (31st percentile). Temperature was 36.6°C, heart rate was 90, respiratory rate 24, blood pressure 94/59, and oxygen saturation 100% on room air.

The physical examination was remarkable for tacky mucus membranes in the oropharynx and dry lips. The eyes were sunken bilaterally. Lungs were clear to auscultation, and the heart had a regular rate and rhythm and there were 2+ pulses throughout. The abdomen was soft, nontender, and non-distended with no hepatosplenomegaly or masses palpated. Uniform, diffuse hyperactive bowel sounds were heard throughout abdomen. The distal extremities were cool with no edema. Capillary refill in the toes was delayed to 3 seconds. The remaining physical examination was within normal limits.

The lab values from the ER visit 2 days prior to admission are presented in Table 2.

A urinalysis performed post-dextrose infusion was significant for 4+ glucose, 4+ ketones with blood glucose

levels of 165 mg/dL concurrently and a calculated glucose level of 295 mg/dL during infusion. The plasma free and total carnitine levels and acylcarnitine profile were within normal limits, as were the serum amino acids. Urine excretions of uracil, uric acid, xanthine, and hypoxanthine were within normal limits with no detectable abnormal purines, pyrimidines, or other metabolites and normal urine organic acid profile. Nutrition, Endocrinology, and Metabolic subspecialists were consulted in this case.

Due to this being the sixth episode of nausea and vomiting with sweet-smelling breath and hypoglycemia, the patient was evaluated for both dehydration and hypoglycemia. With regards to the patient's dehydration, her physical exam was consistent with moderate dehydration at approximately 8% of blood volume, which was further demonstrated by her admission bicarbonate of 16 mEq/L. Secondary to her clinical presentation, she was given two boluses of normal saline and started on IV fluids of half-normal saline (0.45%) with 5% dextrose and 20 mEq/L of KCl. According to the recommendations of the endocrinology service, glucometer checks were done pre- and post-prandially during her hospitalization. These were obtained initially while the patient was on IV fluids and then when she was simply tolerating an oral diet. Blood glucose rose to 73 mg/dL and continued to stay in the mid-70s to mid-90s throughout her hospitalization. On the day after hospitalization, the patient continued to tolerate her oral challenge and was discharged home with a glucometer.

Discussion

There are many potential causes of hypoglycemia with concurrent ketosis as seen in this case. Upon the workup and exclusion of other causes such as hypopituitarism, adrenal insufficiency, and inborn errors of metabolism, the patient was given the diagnosis of exclusion of ketotic hypoglycemia (also called accelerated starvation, idiopathic hypoglycemia, and substrate-limited hypoglycemia) (Table 3). Due to the prevalence of ketotic hypoglycemia in pediatric patients presenting with hypoglycemia, the standard of care in diagnosing this condition is first to rule

Table 3: DDx for Hypoglycemia	
ADULTS	CHILDREN
Drugs (insulin, sulfonylurea, EtOH, pentamidine, TMP-SMX, quinine)	Ketotic hypoglycemia
Critical illness (sepsis, multi-organ failure)	Congenital hyperinsulinism
Liver failure, renal failure	Glycogen storage diseases
Endocrine insufficiency (hypopituitarism, adrenal insufficiency)	D/o of gluconeogenesis
Tumors (inc extrapancreatic)	D/o of amino acid metabolism
Endogenous hyperinsulinism (insulinoma)	D/o of fatty acid metabolism
Autoimmune (Anti-insulin Ab, insulin rec Ab)	Medications (EtOH, salicylates, beta blockers, pentamidine, accidental ingestion of hypoglycemic agents)
Myxedema	Endocrine insufficiency (cortisol deficiency, GH deficiency)
Surreptitious use insulin	Heart disease
Ectopic insulin production	Increased demand (surgery, sepsis, shock, burns, tumors)
Postprandial hypoglycemia	Decreased formation (Reye's syndrome, hepatitis, alpha-1-antitrypsin deficiency)

out other metabolic causes and to reach the diagnosis of ketotic hypoglycemia if the history matches that expected for this condition.

If this diagnosis is questionable, however, it can be confirmed by admitting the patient to the hospital for a supervised diagnostic fast. This test involves subjecting the patient to a prolonged fast for 24-30 hours in a controlled setting with serial monitoring of plasma glucose, ketone bodies, lactate, alanine, and insulin levels. Patients with ketotic hypoglycemia are more likely to develop hypoglycemic episodes that show appropriately decreased insulin levels; normal lactate and pyruvate; elevated GH, cortisol, free fatty acids, and ketones; decreased alanine; normal thyroxine; normal free and total carnitine; no response to glucagon during hypoglycemia but normal response post-overnight fast; and negative urine-reducing substances.

The depth of the metabolic work-up for patients who present with hypoglycemia is an area of active debate. While the current standard of care is that ketotic hypoglycemia is a diagnosis of exclusion, a retrospective medical record review of childhood presentations of hypoglycemia in an urban emergency department concluded that the typical presentation of ketotic hypoglycemia does not warrant a further work-up for inborn errors of metabolism due to the prevalence of ketotic hypoglycemia. The typical presentation described is a one to five year-old with normal growth and development presenting with fasting hypoglycemia, ketonuria without hepatomegaly and with resolution upon glucose administration.[15]

One confounding factor in this case is the large elevation in growth hormone. Hypoglycemia stimulates GH secretion, and previous studies have found GH levels in ketotic hypoglycemia presenting to the ER to be mildly elevated at 0.7-6 ng/ml, which is nearly an order of magnitude less than our patient. [15] The elevated GH was likely related to collection of the sample in the evening given that GH is secreted in a cyclic fashion. The presentation

after fasting and exercise and physical activity also likely contributed. Exercise has been shown to increase serum GH up to 20-30 ng/mL.[16]

Treatment for the patient involves giving a bedtime snack of carbohydrates, avoidance of fasts, snacks prior to prolonged periods of exercise, and frequent high-protein, high-carbohydrate meals. The family was also given a letter to present to the local emergency room should an episode occur giving her presumptive diagnosis of ketotic hypoglycemia and listing the critical lab sample that should be sent out if she did present again with an episode of hypoglycemia. The family was given a glucometer and instructed to take the patient's blood glucose level during times of illness, stress, and exercise and to log her activities and the values. If the blood sugar level was less than 60 mg/dL, she was instructed to eat simple sugars followed by more complex carbohydrates. If less than 50 mg/dL, she was instructed to go to the ER immediately with the letter. Because ketonuria typically precedes serum hypoglycemia, physicians can also monitor blood beta-hydroxybutyrate or urine ketones and increase carbohydrate intake when ketones are present.[17]

Ketotic hypoglycemia is the most common cause of hypoglycemia in children greater than six months of age that present to the ER. The prevalence varies, with some studies citing ketotic hypoglycemia in one-third of ER hypoglycemia visits while other studies cite up to 80%. [10, 11] Episodes typically present between the ages of 18 months and five years, occur infrequently by four to five years of age, and spontaneously remit by age eight or nine. Most patients are expected to outgrow ketotic hypoglycemia. The prevalence has decreased in the past 20 years for unknown reasons.[9] Due to the increased likelihood of ketotic hypoglycemia in lower body weight individuals, the increasing incidence of obesity in children could be a reason for this. Patients with ketotic hypoglycemia are more likely to be Caucasian, male, and those with a lower body weight.

[10, 12, 13] Recent evidence has shown that patients with allergic diseases treated with elimination diets have a high tendency toward developing ketotic hypoglycemia.[14]

The pathogenesis of ketotic hypoglycemia is not well understood. No metabolic difference has been found separating patients with ketotic hypoglycemia except for shortened fasting tolerance. Whether this is an extreme form of the body's normal ability to maintain normoglycemia or a form of an as-yet undiscovered metabolic defect is still to be determined.

In summary, ketotic hypoglycemia is a common cause of hypoglycemia in children, accounting for about a third of hypoglycemia presentations to the ER in children. It is important to rule-out metabolic causes for the hypoglycemia before reaching this diagnosis. Patient education is important to treat this condition to prevent future exacerbations and ER visits until the patient outgrows it.

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Shaundra Eichstadt

Editorial: The Fiery Debate Over Children's Health

Steven Lin, SMS II

More than a hundred people including Stanford medical students, Pediatrics residents and faculty, and community members—rallied at the School of Medicine on October 2, 2007, to protest what has been called “the most inexplicable veto in the history of our country.”

They were, of course, referring to President George W. Bush's veto of a bill that would have reauthorized and expanded the State Children's Health Insurance Program, known as SCHIP, to cover more than 10 million uninsured children. Bush said he vetoed the bill because it was too expensive and goes too far toward federalizing health care. Pediatricians across the country, however, disagreed (Table 1).

Speaking at the Stand Up for Children rally one day before the veto, Lisa Chamberlain, MD, Assistant Professor of Pediatrics at Lucile Packard Children's Hospital, reached out to medical students and young physicians sporting baby blue ribbons, marching and chanting “Stand for SCHIP, Stand for Kids.”

“We are angry,” Chamberlain said. “We are pediatricians. We are nice people, but we don't feel that way today.”

Stanford School of Medicine's Dean Philip Pizzo, also a pediatrician by training, attended the event. “The people we are speaking for can't speak for themselves,” he said. “If SCHIP falls, millions of children will suffer.”

Inspired by this and similar rallies across the nation,

Stanford medical students organized a call-a-thon to convince the House to override the veto. They passed out names and phone numbers of all those representatives who voted against SCHIP, as well as a script to guide call-a-thon participants through their calls.

Despite these efforts, the House failed to override Bush's veto on October 18. However, the efforts of so many individuals at Stanford were not in vain: their advocacy had put pressure on Bush and sparked a firestorm of political activism and debate. The deliberations in Washington over SCHIP have reached a feverish pitch, with Democrats vowing to pass the same bill again and again to force Republicans to commit political suicide on national media.

Most medical students are tired of the endless ideological battle in Washington, and the shameless use of poor children as political props. Many wonder when the real debate will begin: that is, the debate over how to give every person, child or adult, equal access to quality health care in this country. Unlike the politicians in Washington, Stanford medical students remember that the right to health care is a natural human right founded on human dignity and ethical practice. In a country such as the U.S., where resources are virtually unlimited compared to all other parts of the world, the very debate over children's health insurance is a disgraceful sign of our nation's incompetence at protecting basic human rights to medical care. It is up to us as future physicians to protect these rights.



Steven Lin

Table 1. Anatomy of a Debate: Pediatricians vs. President Bush**Pediatricians' Arguments**

72% of Americans support the bill, and it is backed by most governors and health workers; Bush is out of step with American families

The legislation has significant bipartisan support in Congress backed by Democrats and Republicans in both the House and Senate

Raising the tax on cigarettes by 61 cents per pack to \$1 per pack will cover 4 million kids

Bush has spent \$700 billion for the war in Iraq, but is unwilling to spend \$12 billion per year to bring health care to low-income kids

Due to stricter eligibility rules, Bush's plan won't even cover the current 6.6 million kids

The bill would overturn Bush's strict eligibility rules and make it easier to cover families who earn too much to qualify for Medicaid but not enough to afford private coverage

The bill would provide financial incentives for states to cover their lowest-income children first, then expand to cover others in need

Undocumented immigrants are not eligible for SCHIP, and the bill maintains that position

President Bush's Arguments

The bill is an inappropriate expansion of government-run health care and goes too far towards completely socialized health care

Democrats are risking health coverage for poor children purely to score political points by passing a bill they know will be vetoed

The bill would unacceptably raise taxes on working people and hurt low-income smokers

The legislation is too costly and will increase government spending by \$35 billion for a total cost of \$60 billion over 5 years

The White House favors a "clean" reauthorization that costs \$30 billion less

The bill would add middle-class families to a program designed to cover the poor, and shunt scarce federal funding to children with higher incomes at the expense of poorer families

Parents would be prompted to drop private coverage their children already have in order to get cheaper coverage under the bill

Undocumented immigrants would use glaring loopholes in the legislation to enroll in SCHIP



Gabriel Martinez-Diaz

Puzzle Pieces of Infection: Dr. Andrew Nevins, Infectious Disease

Michael Sundberg, SMS I

I've been told that, beyond the piles of books and behind the white-coat curtains, practicing medicine is not too different from assembling a giant jigsaw puzzle. If this is true, then the ultimate puzzles of human health—the thousand-piece Sierra Nevada scenes of medicine—are the patients that Andrew Nevins, MD, attends to on a daily basis.

As a specialist in infectious diseases, Nevins, 35, has seen every bug, bacterium, or blight that the Bay Area can muster...and then some. Any number of internally incubating diseases might walk through the doors of the first-floor infectious disease unit at Stanford Hospital. The place is a magnet for some of the most peculiar and deadly cases of infectious disease around—including multiple drug-resistant staph infections, tubercular osteomyelitis, and a battery of viruses with names that would leave a hypochondriac ventilating into a brown-paper bag.

To top off the list of nasties, there's the occasional presentation of an ever-elusive "unknown"—a name uncomfortably familiar to the one I bestowed on the growth on the wall of my undergrad dorm shower.

Yet, Nevins isn't fazed by the puzzle that arises in battling organisms small enough to fit by the hundreds on the period at the end of this sentence. In fact, it's the challenge of matching wits against earth's most successful organisms that has kept his interest over the years. But what I can't get over is his interest in the plagues that most people avoid like, well, the Plague.

"Bugs are smarter than people," says Nevins matter-of-factly. He smiles at my blank stare, adding, "Infectious disease involves every organ system. It involves kids and adults—everybody. The interplay between bugs and people...I just think it's awesome."

After tagging along for a morning in the infectious disease clinic, I'm inclined to agree. There's a particular unpredictability associated with the specialty, a complexity that arises from the possibility of so many microbes causing a single set of symptoms. Sifting through those possibilities is invigorating; solving the problem is elating.

8:20 am — When I meet up with Nevins in the Boswell Clinic, he's quick to apologize for being "under the weather lately." Yet, after watching him move at a rapid-fire pace around the cluttered discussion room in preparation for his morning patients, I conclude that his definition of 'bad weather' is a little more Californian than my own.

Gazing at his computer screen, Nevins chuckles when



Chantal Forfota

he pulls up an email from a patient he's to see later that day. The email comes complete with a spreadsheet the patient drafted to track his infection. "We see all the best patients here," he mentions to a nearby student starting her first day in the ID clinic. Then, quickly looking over his shoulder at the whiteboard, he points to one on the list and jokes, "I would stay away from that one."

Within ten minutes of my arrival, I'm already at Nevins' heels, listening as he explains what he's learned about his first patient. As I sit through the first interview, with only a little over a month of medical school under my belt, I find myself ticking off categories from the Patient Interview student checklist (and wincing as I realize the true extent of my nerdhood). Nevins completes the interview as if the checklist were built into his head; I find out later this probably isn't far from the truth. As it turns out, Nevins only spends half his time dealing with microbes. In the past several years, he's also become devoted to the education of another, probably slightly less successful, organism—Scholasticus medicus.

Nevins wears many hats. Twice a week he's involved in the Practice of Medicine course for first- and second-year students, an undertaking that was mostly unplanned, but has served as both an opportunity for him to teach and to delve into curriculum development.

"I wound up volunteering when I was a second-year fellow to teach the Practice of Medicine course, and I just loved it. It was so much fun to do it," says Nevins, who

soon realized he much preferred teaching to the usual path of fellowship research. “I saw you can actually have a career in an academic medical center, where you aren’t a researcher. Where your teaching skills are valued, and you’re still a clinician.”

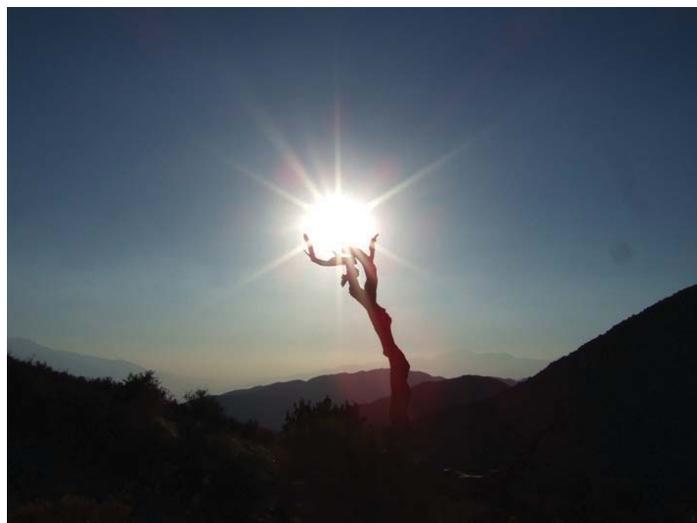
9:00 am — After meeting with his first patient, Nevins is back at high speed. He grabs another bite of his PowerBar breakfast, pulls out information on his next patient, and we’re off again. This time it’s to visit a patient with an infection in the sternum to discuss further treatment options. After reviewing a list of antibiotics that sound like a foreign language, their effects, and how they’ll be administered, both patient and doctor work out a plan of attack.

Nevins doesn’t need to say much to make it clear that the well-being of his patients is important to him; it shows in his actions and the diversity of patients he sees. Twice a week, he works primarily with HIV/AIDS affected individuals, helping them to clinically manage the disease. Knowing this, I probe his philosophy on dealing with the tough moments most physicians will eventual face—death of their patients, suffering, and intense pain.

“When it comes to people who are chronically ill, I tend to be an eternal optimist,” says Nevins. It’s a phrase he commonly uses to remind patients, nervous over the longevity of their troubles, that he won’t give up trying to help them despite the uncertainty of their situation.

12:00 pm — Finally, with a list of patients checked off by noon, Nevins’ clinic hours are over; he’ll use the rest of his day to focus on another of his many jobs—be it teaching, planning for standardized patient interviews, or prepping for future patients. And perhaps, if he’s got a chance this week, he’ll venture out of the hospital for a game of ice hockey at a local rink.

After a day in the infectious disease clinic, I’ve concluded that it’s true what I’ve heard—practicing medicine, especially infectious disease, really is like a putting together an intricate jigsaw puzzle. Yet there’s more to it than just fitting tessellated tabs into the correct slots. There’s also the task of finding the pieces that have fallen under the table because of negligence or a mistake on the part of others involved in the puzzle’s construction. And sometimes, you even have to design your own pieces of painted cardboard in order to add something to the final picture that wasn’t there before, pieces that help to make the image just a little more scenic.



Alex Cardenas



Ricky Tong

Operating under Pressure: Dr. John Morton, General Surgery

Gavitt Woodard, SMS II

6:00 am, Wake up — Dr. John Morton starts his day with coffee made from beans grown at his family’s farm in El Salvador. For breakfast, he follows the same disciplined guidelines he gives to his bariatric patients: high protein, low sugar, and small servings. On weekdays this means a protein bar and yogurt, but he doesn’t eat just any yogurt. It has to be special Emmi Swiss Yogurt which contains *Lactobacillus acidophilus*, a probiotic bacteria. Dr. Morton has reason to be picky; last week at the American College of Surgeons annual meeting, he presented a study showing that gastric bypass patients who take probiotics following surgery have fewer instances of bacterial overgrowth and lose more weight. The probiotic study is just one of many research projects that Dr. Morton oversees. His groundbreaking research and bariatric expertise take him to conferences and talks around the world. In the past two months he’s presented in Amsterdam, Portugal, Cleveland, and New Orleans. While the trips are packed with business, Dr. Morton always finds time to dine at the best restaurants in town and shop for souvenirs. Last month in Portugal, he picked up a new Carolina Herrera tailored suit, which he dons this morning before walking from his apartment in Stanford West to Stanford Hospital.

7:00 am, Presenting at Grand Rounds — As the Director of Surgical Quality, Dr. Morton has the honor of introducing the Surgery Center for Outcomes Research and Evaluation at Grand Rounds. SCORE is a new initiative in the Department of Surgery that seeks to lead surgical- and interventional-based health policy, outcomes, and research. SCORE will emphasize quality improvement, patient safety, evaluation of new technology, and special population competency. In addition, as director of surgical quality, he discussed new initiatives in quality improvement with both Dean Pizzo and hospital CEO Martha Marsh present.

8:00 am, Meeting with Biostatistician — Today is a Tuesday, which is one of Dr. Morton’s two OR days. While the first patient is being prepped, he stops by his office to meet with his full-time biostatistician, Tina Hernandez Boussard. In a few days, he will be off to New Orleans again, and they need to review the results from his study examining pediatric obesity-related admission rates from 1998-2004. The study found that kids are admitted more often for obesity than malnutrition. The Agence France Press picked up this story quoting Dr. Morton’s statement, “It looks like we have won the war on hunger, but now we have new campaign to lead the war on obesity.” Dr. Morton is already an author on over fifty papers and has nine medical students researching with him; as a result, data pour in constantly.



Anna Lonyai

9:00 am, First Roux-en-Y Gastric Bypass Surgery — The patient is a 36-year-old woman with a BMI of 49. Treating morbid obesity allows Dr. Morton to combine his laparoscopic, public health, and outcomes training. He screens and counsels all patients prior to surgery with a team of clinicians, nutritionists, and psychologists. He maintains detailed outcomes data on all of his patients. He does extensive follow-up to ensure that patients maintain good health and continue losing weight. He believes a physician builds a record one patient at a time, and his record is impressive. He has done over 1,000 bariatric surgeries, has a 0% mortality rate, and has complication rates much lower than national averages. After surgery, patients will lose on average 78% of their excess body weight. His patient’s health improves dramatically after surgery so the specialty is rewarding. Patients love him and often show up to his clinic bearing gifts, proudly showing off their new bodies and raving about the surgery that gave them their lives back. It’s no surprise that the American College of Surgeons just named Stanford the only Bariatric Surgery Center of Excellence in Northern California.

12:00 pm, Lunch and more emailing — Dr. Morton receives over 60 emails a day that require a personal response, so between cases he heads back to his office for a quick update.

1:00 pm, Second Roux-en-Y Gastric Bypass Surgery — The day’s second case is another gastric bypass. This patient

has a BMI of 62, which is high even by morbid obesity standards. The heavier the patient, the more difficult the procedure becomes because the surgeons must work through a thicker abdominal wall. Many medical centers will not accept someone with a BMI over 50, but Dr. Morton routinely operates on these patients. He's even accepted a patient with a BMI of 92 and a patient who weighed 494 lbs. On these bigger patients, he has bent the long metal laparoscopic tools and snapped every type of suture while fighting against the resistance of their abdomen. He jokes that the surgery would be a lot easier if the patients weren't so big.

Working at an academic hospital like Stanford allows Dr. Morton to be a teacher, a calling he values given that both his parents were teachers. This winter quarter, he will be leading a novel medical school lecture series, "Obesity in America." He also does clinical instruction in the OR. During surgery, Dr. Morton quizzes the group on topics ranging from physiologic and clinical implications of obesity to obscure historical facts. One of his favorite questions is, "During the civil war, what was the first capital of the Confederacy?" He loves this one because it was the final

question when he was a contestant on Jeopardy, and of course he got it right. The answer is Dr. Morton's hometown of Montgomery, Alabama.

4:00 pm, Gym — After leaving the hospital Dr. Morton heads to Equinox Gym where he works out every day. He jokes that the ability to fit into slim cut suits doesn't happen by accident.

6:30 pm, Nola's Celebration Dinner — A few days earlier, Dr. Morton was promoted four years early to Associate Professor and tonight he sits at the head of the table as his research team celebrates over dinner and drinks. Nola's—a New Orleans-themed restaurant in downtown Palo Alto—is a fitting venue for the occasion. Dr. Morton received his B.S., M.D., and M.P.H. from Tulane, where he developed an appreciation for good food and good company. During his time at Stanford, he is grateful for his clinical and research accomplishments but he states, "I consider myself most fortunate to work with the best medical students in the universe."



Anna Lonyai

Listening to Kids: Dr. Shashank Joshi, Child Psychiatry

Chantal Forfota, SMS II

A colorful nursery school diploma hangs between those from medical school, residency, and beyond. Teaching awards are sandwiched between modern art prints and photographs of jazz musicians. Yes, Dr. Shashank Joshi is an accomplished medical professional; yes, he is the Director of Training of the Child and Adolescent Psychiatry Fellowship; yes, he has mastered the teaching, research, and patient care trifecta. But he also has a sense of humor, an imagination, and a deep interest in what kids have to say. Leaving his office, I ask Dr. Joshi if he is a musician; turns out he was involved in musical theater in a former life. That's part of the reason he became interested in child psychiatry. "There is a theatrical component to it," he says, with a twinkle in his eye.

6:30 am — "Is it Halloween yet?" asks Dr. Joshi's five-year-old son Aanand, eager to don his pirate costume. His daughter Amrit, a two-year-old elephant, is not far behind. Dr. Joshi helps them to get dressed and heads out the door.

9:00 am, Antipsychotic Jeopardy! — Dr. Joshi arrives at work with a speck of glitter on his forehead and a bag of Halloween candy in hand. "Pirates are big this year," he smiles, greeting his second-year fellows. On any given Wednesday, fellows have a morning full of didactic coursework. Other days, they see patients in various clinics on campus. This morning the fellows are reviewing for the board exam (Step 4000), which they will take next week.

"What are ziprasidone, pimozidine, risperidone?" Three meds for Tourette's. Two hundred points for Evan. "Side-effects for 600," challenges Melinda, the chief fellow. A discussion of cardiac electrical problems and drug interactions ensues. Dr. Joshi adds a brief editorial about what he calls "drug wars," each pharmaceutical company educating doctors about the side-effects of its competitors' drugs.

"Which of these drugs causes the least elevation in prolactin levels?" Six hundred to Meera. Dr. Joshi adds that we don't have enough data to know what slightly elevated prolactin levels mean for patients. The side effects appear to be minimal, but there may be a slight increase in normal gynecomastia for boys at puberty or amenorrhea for girls.

"So what should we tell patients and parents?" the fel-

lows ask. "Should we tell them about a potential side-effect that is not well-established?"

"Good question," Dr. Joshi responds. "In these situations, I ask myself, What if it were my kid? If it were my kid, I would want to know."

12:00 pm — Over lunch, a fellow asks to consult about a difficult case. Annie, a mildly autistic 12-year-old, is having social problems at school. Dr. Joshi and the fellow discuss how to best communicate with Annie, her teachers, and the school principal.

Dr. Joshi and his team frequently work with the Palo Alto and Ravenswood School Districts. School mental health is one of Dr. Joshi's research areas. He studies the effects of mainstreaming autistic kids, how to build instructional tolerance among teachers and administrators, and how best to conduct psychotherapeutic interventions in school settings.

2:30 pm, Patient interview, Jamie — "Hey Dr. Joshi," Jamie smiles. He is a slim teenaged boy with bright eyes and a relaxed demeanor. His hands and feet seem a little too big for him.

"You got your haircut," notices Dr. Joshi. "And shaved the goatee?"

"Yeah, I'm going to start looking for a job. Figured I had to clean up a little bit," Jamie chuckles.

"I like the T-shirt. Is that a band?"

asks Dr. Joshi, remembering Jamie's interest in music. "Been to any shows lately?"

Jamie was a regular teenaged kid until one year ago, when he presented with purple spots on his legs and severe abdominal pain. He was diagnosed with Henoch-Schonlein Purpura. A type of hypersensitivity vasculitis, HSP causes an autoimmune response in small blood vessels, resulting in skin rashes, gastrointestinal problems, and glomerulonephritis.

Jamie had no previous psychiatric history, but with the onset of HSP, he began high dose steroid treatment, which caused severe mood swings. Jamie's relationship with his parents became volatile and he increased his marijuana use. Although Jamie is not bipolar, his mood swings are bipolar in nature, and Dr. Joshi prescribed medication to manage those symptoms.

Today Jamie is in good spirits and seems a normal, slightly awkward 18-year-old. Aren't most boys his age



Shashank Joshi

slightly awkward? He reports more stable moods and better communication with his parents. He proudly explains that he just passed his GED and is ready to start looking for a job.

Dr. Joshi asks several mood-related questions. Are you angry, tired, nervous or anxious? Do you feel guilty or bad about anything? Jamie's answers are all benign. I wonder if my presence in the room is altering his responses. Jamie and Dr. Joshi talk about medications and discuss starting a gluten-free diet and adding Omega-3 fish oil. With respect to diet and complementary medicine, Dr. Joshi says, "Hey, if it makes you feel better, and it doesn't hurt, I'm all for it."

Then Dr. Joshi talks with Jamie's parents alone. They reflect on Jamie's progress, express their own frustrations, and their hope that the worst is behind them.

I am struck by integration on a number of levels – the integration of physical and psychiatric medicine, psychopharmacology, psychotherapy and complementary medicine, and the treatment of both the adolescent and the parents.

4:30 pm, Patient interview, Diego – Diego is a twelve-year-old with pronounced autism. He is mainstreamed in a Catholic parochial school where he has no friends; oddly, he doesn't seem to mind. He clutches his laptop computer, eager to show Dr. Joshi his latest work.

Dr. Joshi asks Diego to tell me about his condition. Diego explains at rapid-fire pace with an eerily advanced vocabulary.

"I am a high functioning autistic," he begins, looking to the side. "It is hard for me to understand what other people think or feel. I like to watch movies and read a lot. When I read, I picture the words in my head like a movie. Everyone does that. When I read, I hear an actor's voice speaking the words, like Jude Law. Sometimes I have synesthesia, where I see numbers or colors instead of words. I write stories on Fan Fiction [a website] and I get 500 hits a day."

I wonder if he's memorized this litany. What does it really mean to him? "What do you write about, Diego?" I

ask.

"Mostly cross-over science fiction. I take the names and characters from other books, so that makes me a criminal," Diego laughs. "Like *The Lord of the Rings*, and the *Silmarillion* and others. I blend the stories together and make whole other worlds. I call it scripting."

"Does that world ever seem more real to you than this one?" Dr. Joshi asks. "Yes, sometimes I get distracted and start scripting when I'm in school and then I get in trouble."

"Diego, what did you do earlier today?" Dr. Joshi asks.

Diego barely takes a breath before responding, "I was dressed as a centurion at school. A centurion is a commander in the Roman Army." He makes eye contact with Dr. Joshi more than with me, but still rarely.

"Did the other kids like your costume?"

"Yes. They didn't know what a centurion was, so they called it a gladiator."

"Your mom told me you went to a funeral this afternoon," Dr. Joshi prompts. "For your little cousin, who was a stillborn baby?"

"Yes."

"Can you tell me about that?"

No response.

"What do you think happens when people die?" Dr. Joshi continues.

"Heaven." Diego is alert, focused, but his affect is flat, matter-of-fact. It does seem as though he is reading from a script.

"What is heaven like?"

"Heaven is like here."

"Did you pray for your cousin today?"

"Yes. I said a song from Tolkien, to help her go to Valinor, which is where the elves go for the afterlife." Diego's mom says later to Dr. Joshi that this prayer is meaningful to Diego. It is his way of connecting.

Dr. Joshi takes Diego's height, weight, and blood pressure. He asks about palpitations or other cardiac symptoms. He talks with Diego's mom about medication management and gives her a new prescription. "See you in four weeks," Dr. Joshi says warmly.

Afterwards Dr. Joshi and I discuss Diego's case. We speculate about the extent to which Diego feels emotions. Yes, he can feel. He gets frustrated and angry. He is passionate about his creative writing. He was upset when his teacher's aid died suddenly last year. But his interpersonal emotions are limited. It's not clear how much he can conceptualize the emotional reality of other people.

I wonder about the long-term prognosis for Diego. What are the goals of his treatment? What kind of life can he expect? But we don't have time to discuss this. In the meantime, I am glad that Diego has his creative fiction, that his mind is able to invent other worlds that intrigue him, that he has a loving family and a great doctor who care about him and who are interested in his mind, body, and heart.

6:30 pm – Trick or Treat!



Sashank Joshi

Putting out the Midnight Fires: Dr. Matt Strehlow, Emergency Medicine

Jeremiah Ray, SMS II

When I met Dr. Matt Strehlow, I thought he was a clinical student, maybe a fourth-year. I was mistaken, not because he looks young, which at age 32 he does, but because of his unadulterated smile. It's a smile that is worn out of many physicians and then replaced by a counterfeit smile that's akin to the coffee at Motel 6—just not the real thing. I liked that about Matt, so I spent a Friday night as his wingman to see how a lighthearted individual managed the stressful role of an emergency medicine physician.

15:00 — When emergency department attendings switch shifts, all the residents gather around a giant plasma TV monitor that lists the patients. The outbound Dr. Harter introduces the inbound Dr. Strehlow to the key facts on each patient. Despite a background of screaming and constant alarms, Matt leans back in his chair, arms casually behind his head, waiting to get the run down.

Dr. Harter starts off: "In room three, a man was tazered in the chest."

Matt zeroes in on the important facts: "Did we get the prongs out?"

"Yes, but he's still yelling."

"He can yell in room five. Let's move him."

"He's combative," Dr. Harter warns.

"Not with me," Matt replies. I am beginning to think this is a good night to be here.

Dr. Harter continues, "Room 1A, 80-year-old female, fell down while hopping a fence when running from a security guard." Matt, visibly entertained, nods Dr. Harter on. "Room 7A, 48-year-old woman, portal hypertension, ascites, abdominal pain."

Matt has heard this song before: "Neeext."

16:05 — Matt has checked up on the residents and greeted the nurses. I expect him to start suturing or to begin chest compressions, but he surprises me and just leans against a counter top. "I'm here to stamp out forest fires," he says with a smile. The first flames come forth almost instantly — two harried residents approach from opposite directions with ECGs and patient charts. He scans an ECG and instantaneously comments on the heart block. Good ED physicians have insane pattern recognition skills. Matt turns to me and adds, "In normal medicine, if a patient needs more help, you spend more time on them. Here, you move faster."

Resident number two doesn't know which antibiotic therapy to select. Matt has endless combinations of antibiotics and their indications rolodexed in his memory; he reminds resident number two about the contraindications with various blood thinners. Case after case, he compliments each resident for their solid work, sometimes throws in a suggestion, and usually caps it off with a joke, sending



Jeremiah Ray

each resident away uplifted. Seems like good medicine for all.

17:00 — We continue to dart from room to room 'stamping out forest fires.' The nurses cannot get an IV started in room 7D; Matt gets it. The man in 5C needs a lumbar puncture. By this point, we have gelled our hands nearly 70 times, and I am sweating. Matt is picking up speed and getting into his groove, tackling the difficult procedures that the residents cannot. Meanwhile, I need a snack.

17:08 — The first official 'trauma' comes in—a bike versus cement truck. Matt stands near the foot of the bloodied bed and watches as his residents work methodically. He does not say a word, which means the residents are doing well. No forest fires here.

17:31 — Trauma number two: a man was working on his car. It fell off the jack onto him, and then both tires ran him over. I count six people working at each bed in the trauma bay. The heart rate monitor alarms pierce the room: tachycardic at 160, O2 sat falling. Matt peers intently at the traumas, ready to intervene if the Grim Reaper dances a little too closely.

19:10 — In my mind, all the patients start running together. I have no idea how long I have been in the ED. I just know that I have not stopped moving—six hours could easily have been two or ten. There are no windows, and there is no regularity to what we do. We just keep executing. Matt

is working up a chart and notices the patient's temperature is missing and furrows his brow, "In a non-detail oriented field, every detail matters."

20:00 — We are examining chest X-rays with a resident and find ourselves enjoying our chairs, not wanting to leave this refuge. Matt turns to me, "So what can I tell you?"

"What's the best part of your job?" I ask. He chuckles, knowing he has only moments to answer my vague, volume-worthy inquiry.

"When no one else will take care of these patients, I will," Matt replies. "I love the diversity of the job. I'm working on research, lectures, and conferences in addition to this. Right now we're setting up a '911' system in India — in here I save one life at a time; doing that, we save millions."

20:43 — We are seeing an older man reporting chest pain. Like so many patients, he is angry — at the wait, at the lack of dinner, at the noise. Matt switches gears; wearing an expression of remorse, he agrees with the patient, agrees that waiting is terrible and apologizes for not being able to work faster. Medicine is more than the physical remedy.

Later, Matt turns to me, "There are not a lot of 'pats on the back' from your patients. Some people just need be up-

set for a minute. It can get you down when patients don't understand the situation in the ED. But when you make a difference or save one person's life — whether they know it or not — it's worth a million pats on the back. That's what keeps us going."

22:00 — I catch Matt zoning out; it's the first hint of fatigue I have seen all night. I ask if he ever gets used to the shift work. "You never really get used to the schedule. It's always hard working a quarter of all your weekends, nights, and holidays. But when patients come in, crashing in front of you and you save their life — what an adrenaline rush. Talk about instant gratification. It's worth it."

23:40 — My feet are aching after eight hours of running from room to room, my legs are fatigued and my contacts dry. I find sanctuary in an empty chair. As I collapse into this ergonomic haven at the nurse's station, a poster catches my eye. It reads, "Need to call a code 'STEMI'? Call the page operator and call the Cath lab IF Monday thru Friday between the hours of 7am-6pm (excluding holidays)." Apparently, some are under the impression that heart attacks work nine to five with holidays off. I guess that is why it is nearly midnight on a Friday night and Matt is busily putting out forest fires.



Mike Sundberg

Making a Hepatoportoenterostomy Look Like Child's Play: Dr. Sanjeev Dutta, Pediatric Surgery

Blake Charlton, SMS I

It's an autumn wine-and-cheese surgery social; most scalpel-wielders are styling the oxford wool and sensible haircut look. That's why Dr. Sanjeev Dutta's black leather jacket and spiky hair is so easy to spot. His predilection for Family Guy jokes and indie rock in the OR have won him a reputation as the "cool and approachable" attending in pediatric surgery. After needing a second-year for an introduction, I discover Dutta's demeanor is quirky and relaxed—a fact that belies his forty published journal articles, eleven book chapters, and hand in endeavors ranging from the Stanford's Goodman Simulation Center to the surgical device design at SRI International.

A month into medical school and barely able to distinguish mesentery from smooth muscle, I wake to an alarm crowing out 5 am so I can round with the peds surgical team before the big DoD: Day of Dutta.

7:24 am — The team catches up with Dutta in a small pre-op holding room. He's standing before two anxious parents. Their five-year-old son, AS, is wailing in the mother's arms. The boy has messy brown hair, wide dark eyes, and Hirschsprung Disease—a developmental condition that has left the last few inches of his descending colon without the ganglia necessary for rectal relaxation. Dr. Dutta had hoped to correct AS's condition with a "pull through" surgery, which would remove the aganglionic bowel and pull the innervated colon down to the rectum. But AS is running a fever and his nose is running something much worse than that. When Dutta explains that the flu makes surgery too dangerous, the mother is visibly relieved. The father, however, launches a bevy a questions about rescheduling. He's frightened and more than a little angry. The couple had to wake up at three in the morning to drive out from the Central Valley—an expensive

endeavor, given the price of gas and a missed workday. Nodding sympathetically, Dutta acknowledges the aggravating situation. They begin to discuss what to look for in their son before bringing him in again. Meanwhile the team spills back into the general holding area. The pull-through was supposed to fill the entire morning. The unexpected opening in the schedule has to be filled.

7:45 am — In the darkness of the peds reading room, the team huddles around three luminescent computer screens. The resident is reviewing patient radiographs. Dutta interrupts with a few pointed questions but remains focused on the search. The situation's a sticky wicket: the afternoon's reserved for a Kasai procedure—an elaborate operation that could run late if its start is delayed. As a result, our hunt is for a patient who needs a discrete procedure that will not require too much preparation.



Blake Charlton

8:03 am — After identifying a fifteen-month-old in need of a central line, the team hikes up to Ward Three East only to discover that the patient's INR—a measure of extrinsic blood coagulation—has risen to nearly double the normal value. After consulting the nurses, Dutta decides surgery is too risky. With the hunt back on, the team defaults to rounding.

8:16 am — On Ward Two West sunlight is at last pouring through the windows to illuminate the rooms. The team has discovered an unusual but promising candidate. At only nine months old, ML has endured more trouble than most do in a lifetime. Born with a pelvic duplication anomaly, ML possessed two bladders, two uteri, two urethras, and two vaginas. Counterintuitively, none of this doubling

is causing her trouble; all the plumbing seems connected and functional. But the partial duplication of the bones of her pelvis is a different story. The orthopedic surgery to correct the bones has disturbed her bowel into producing obstructing adhesions that need to be removed. After examining ML's chart, Dutta consults her nurse and pediatric cardiology. When all the responses come back positive, he gives the nod and we are off.

8:55 am — As OR 21 bustles with the rituals of preparation, Dutta quizzes the team about the procedure and hands me a few CDs with instructions for "something loud to start off." That loud something turns out to be The White Stripes played at top volume on the OR's computer. A few minutes later, the patient is ready and the stage is set. I'm amazed by the tiny surgical field. To me, ML's miniature and delicate anatomy seems to require cuts so exact they'd make a ninja sweat. But Dutta and his team make the opening incision with precision and a calm confidence.

10:20 am — With ML's tiny bowel now completely exposed, both Dutta and his resident scrutinize its every centimeter for adhesions. Meanwhile The White Stripes album ends, and Dutta asks for an obscure indie group named The Knife. If you could mash Bjork's vocals with Moby's electronica and then push them both down a long flight of stairs with a baby grand piano, it'd sound pretty close to the resulting mix of beat, chorus, and cacophony that comes blasting out of the computer. It's not bad, just very strange. Before long, the team is joshing Dutta about his strange musical taste. Smiling, he returns fire and gives

as good as he gets.

10:34 am — The banter goes quiet as Dutta discovers a dark knot of strangulated bowel. On direction, I turn down the music so the team can focus on resecting the bit of small intestine.

10:45 am — With the troublesome section of gut removed and the resulting ends anastomosed, the atmosphere lightens. As Dutta directs the closure, talk within the team ranges from Star Wars to the golden age of Hip Hop.

11:27 am — With ML closed and her condition looking optimal, the team readies for lunch. Most everyone is talking about the upcoming Kasai Procedure, which involves the removal of a defective gallbladder and common bile duct, with direct connection of the small intestine to the liver. I'm disappointed that I won't be able to see the surgery; I have an anatomy "walkabout" exam on the upper limb. More troublesome (in a meta-journalism kinda way) I don't know how I'm going to write the rest of the "Day in the Life" article I've promised to *H&P*. Dutta laughs when I tell him this. "Don't worry: I'll tell you how it will go," he says. "We'll start the Kasai around three. It'll run until about six. I'll get to the gym in time to meet my wife on the treadmill. We'll dash home to enjoy a dinner and a glass of wine. I'll fall asleep the moment my head hits the pillow, and get up tomorrow to do it all over again." His grin suggests he wouldn't have it any other way.



Ricky Tong

Composed Upon Westminster Bridge, Sept. 3, 1802

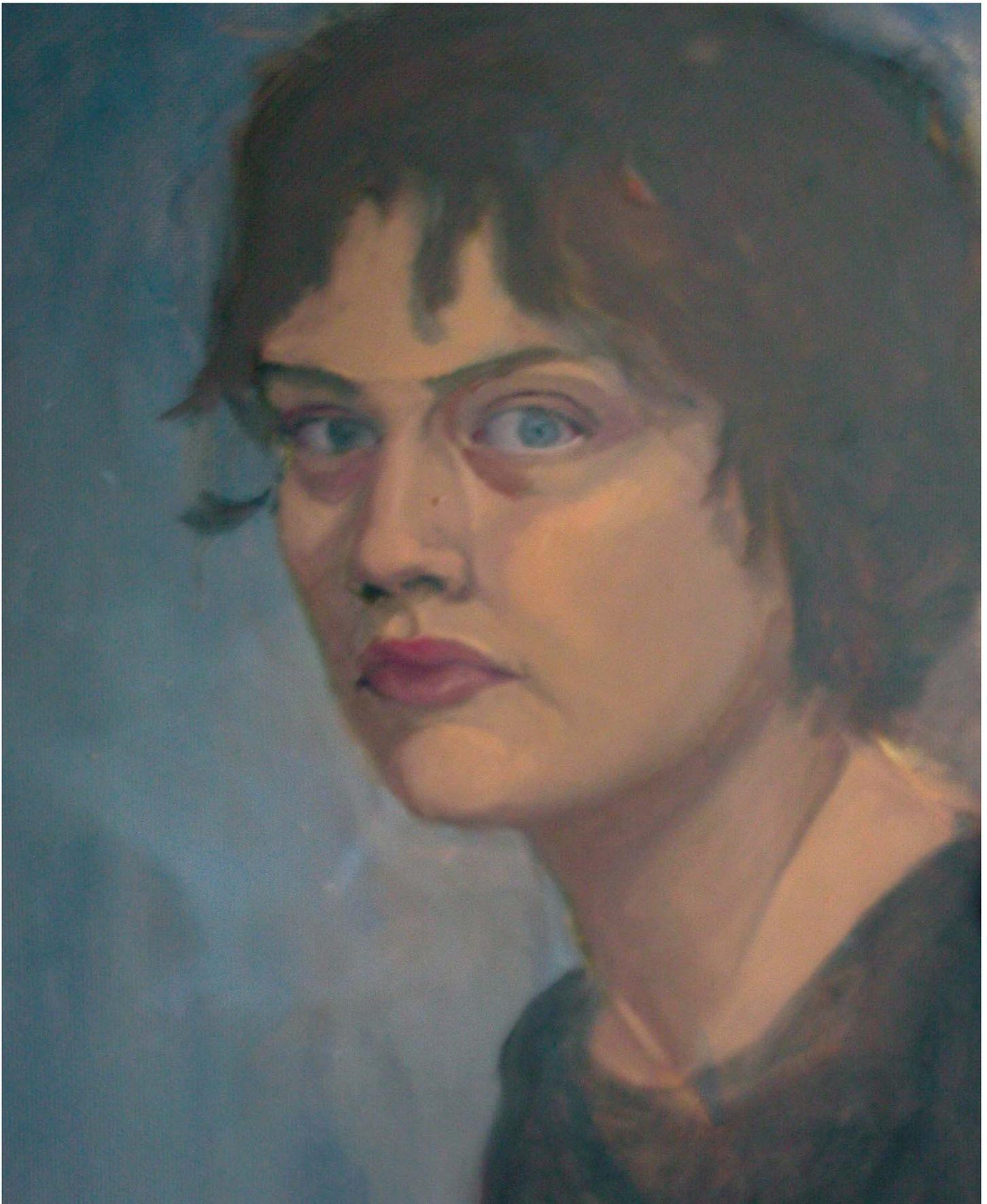
Earth has not anything to show more fair:
Dull would he be of soul who could pass by
A sight so touching in its majesty:
This City now doth, like a garment, wear
The beauty of the morning; silent, bare,
Ships, towers, domes, theatres, and temples lie
Open unto the fields, and to the sky;
All bright and glittering in the smokeless air.
Never did sun more beautifully steep
In his first splendour, valley, rock, or hill;
Ne'er saw I, never felt, a calm so deep!
The river glideth at his own sweet will:
Dear God! the very houses seem asleep;
And all that mighty heart is lying still!

William Wordsworth

Composed Upon a Syllabus, Feb. 5, 2007

These things are secrets and joys of the Earth:
Lifeless would be those not keen to study
The inner workings of mankind's body:
This student now does, like a worn book, bear
The underlining of knowledge; loved, shared,
Anatomy and physiology
Are staples of the USMLE;
Competing for high-yield efficiency.
Never did brain more beautifully reap
In its differential, healthy or ill;
Ne'er missed I a mnemonic to keep!
The textbooks dog-eared at each page and pill:
Oh my! The desire to fall asleep;
And all that potential space left to fill!

Alana Frost, SMS II



Girl
Oil on canvas

Ariel Williams

Homelade

When you walked into the garden to find a lily,
I submerged my spoon in the marmalade that your mother made
And brought the heaping glossy mass to my lips,
Smiling as I swallowed.

I submerged my spoon in the marmalade that your mother made
After the spoon had seen peanut butter.
Smiling as I swallowed,
I thought of your mother's rage.

After the spoon had seen peanut butter,
Probably mayonnaise too because Charlie likes tunafish sandwiches again.
I thought of your mother's rage
At bringing such disreputable guests into her precious homelade.

Dona Tversky, SMS IV



Laura Prolo



Bory Kea

My Summer in the Tenderloin

Elsie Gyang, SMS II

When you travel to San Francisco, the prospect of sightseeing, dancing, and having an overall good time might be what excites you most about the city. There's Fisherman's Wharf, famous for its clam chowder and "I HEART San Francisco" paraphernalia. North Beach hosts the city's best Italian restaurants and has one of the wilder nightlife scenes. Oh, and let's not forget the oh-so-windy-Lombard Street. Bill Cosby once joked, "Yeah, Lombard Street, wonderful street... they got flowers where they've buried the people who have killed themselves there!"

What you may not get to see, or more likely what you may try to avoid completely, is the neighborhood known as the Tenderloin; a neighborhood that sits between 6th & Taylor and 9th & Van Ness in downtown SF. The Tenderloin used to be notorious for its glamorous burlesque houses, boxing gyms, and colorful nightlife. That was decades ago. Today, after the music has faded and the dancers are long gone, the Tenderloin is now known for its crime and drugs and houses some of the city's most impoverished citizens. Burlesque houses have been replaced with unsavory strip clubs. Corner liquor stores abound. Drug addicts and prostitutes are easy to spot and can often be seen weaving in and out of a crowd of downtrodden individuals who stand in line waiting for food, shelter, or social security payments. One of the more dangerous areas in the Tenderloin—Boeddeker Park, located at the corner of Ellis and Jones Street—serves as one of the city's biggest drug-dealing areas and is ironically located right across the street from a police station.

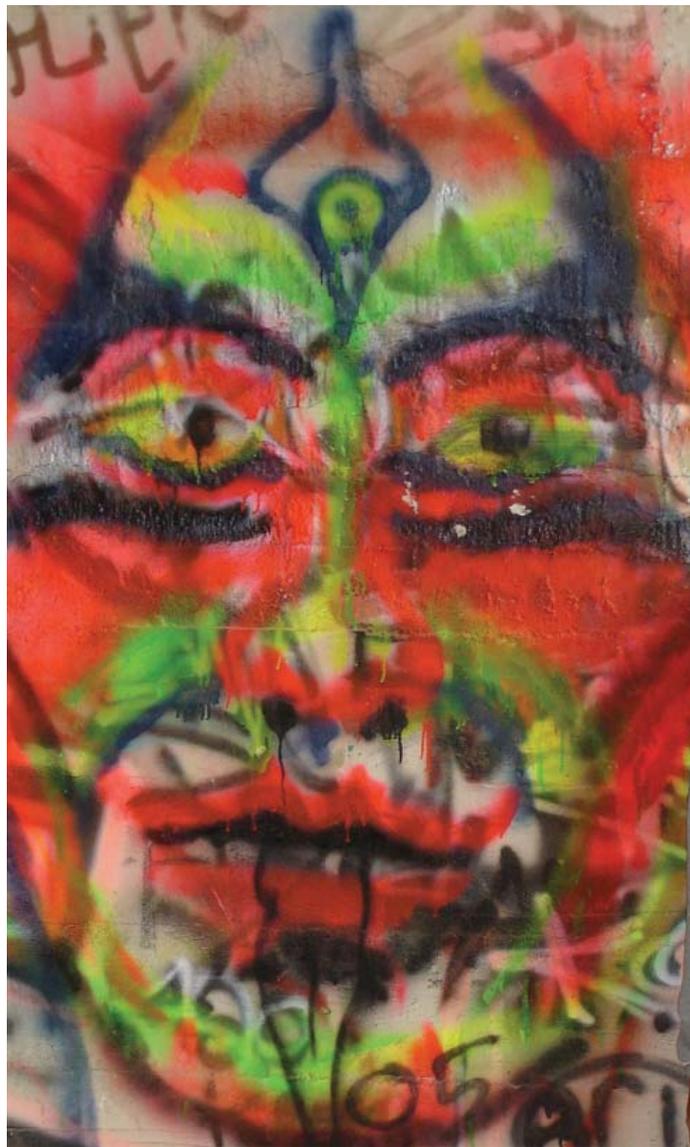
Although the negative aspects of the Tenderloin are easy to spot, if you dig a little deeper you can find the wealth of positives: I discovered them during my summer as a public policy intern for the Mental Health Associa-

tion—a non-profit organization located on Market Street, between 3rd and 4th. As a summer intern I was often faced with the task of leaving the comfort of the Union Square area and heading East through the Tenderloin to get to numerous Supportive Housing meetings. Even as an ex-New Yorker, I must admit, this was not always an easy under-

taking, especially after the day a group of teenagers decided to execute a drive-by shooting near the office. But alas, many interns had braved the streets of the Tenderloin before me, so the task was not impossible.

Supportive housing in San Francisco primarily consists of single-room occupancy quarters in hotel buildings the city rents out in order to provide housing to disabled, mentally ill, and homeless citizens at affordable prices. The purpose of the Supportive housing meetings hosted by the MHA was to give residents, social workers, and other local stakeholders a forum to air their grievances and work together to fix important problems. During one of my first meetings, we sat in groups of five and went around the circle commenting on what we liked about the Tenderloin. As a naïve observer I withheld any comment since, as far as I was concerned, there were no positives. I was pleasantly surprised by the responses of others.

Many attendants mentioned that they loved the warmth of the Tenderloin community, the diversity of its inhabitants, the sense of gratitude they received from those they helped, and the untapped potential of the neighborhood. One individual who lived in supportive housing talked about the group he organized to make breakfast and brew coffee for tenants who had to leave for work early in the morning. Another tenant in a different building described the newsletters he made to inform others of the positive attitudes they could adopt in order to build a better sense of resiliency. A social worker mentioned how good she felt in knowing that those she served were grateful for her presence and her work.



Steve Ortiz



Nina Patel

One new intern at a Catholic-based non-profit organization put my silence to shame. Although she had only been working in the Tenderloin for about a week, she noticed that as the days went on, people recognized her in the morning and would greet her with a smile.

After interacting with Tenderloin residents for three months, I too left with these positive impressions. For many residents, the Tenderloin represents a place in which they can grow at their own pace and feel supported in the

company of friends and advocates. Through programs put on by MHA and other non-profit groups, many reported that with the help of those who believed in their inherent worth, they found voices they never knew they had. Tenants learned to stand up to unfair housing rules; many learned to build more of a community in their respective buildings; and others took great pride in weaning themselves off of detrimental behaviors. As one community activist said, "It's our job to help other people want to do the right thing." The overwhelming sense I got from the community was that they hoped that the positivity and optimism of some would one day grow into a force that could break through the stifling atmosphere of gloom and complacency that currently exists in the neighborhood.

At the end of my time at MHA, I learned much about city politics, national health policies, and the mission of city, county, and state mental health agencies. What I enjoyed most was my interaction with Tenderloin community members. People who live in the Tenderloin can teach you a great deal about human resilience and the inherent worth of each human life as well as renew your humanitarian spirit after months of cramming for medical school exams. So on your next trip to San Francisco, think about the Tenderloin. And when you go, don't just skim its surface. Take time to appreciate and understand what the Tenderloin was, what it is today, and what it could be tomorrow. In the Tenderloin, a little help can go a long way.



Chris Hemond

An Interview with Dr. Thomas Krummel

Sean Sachdev, SMS I

Dr. Thomas Krummel is Emile Holman Professor and Chair in the Department of Surgery at Stanford Hospital and Susan B. Ford Surgeon-in-Chief at Lucile Packard Children's Hospital. A world-renowned pediatric surgeon, Dr. Krummel's pioneering work has significantly shaped the fields of pediatric and general surgery. As a surgical resident at the Medical College of Virginia, he formed one of the first Extracorporeal Membrane Oxygenation (ECMO) teams in the world, leading to widespread adoption of the now well-established life support technique. Dr. Krummel subsequently completed his training with a Fellowship in Pediatric Surgery at the Children's Hospital of Pittsburgh and Research Fellowships at both MCV and UCSF. He is currently leading research efforts on regenerative repair of fetal wounds with the support of a two million dollar NIH grant providing funding for over 15 years of study. His extensive work in simulation-based surgical training has also been heavily supported by the NIH and has led to two Smithsonian Information Technology Innovators Awards.

How long have you been practicing medicine?

I have been practicing medicine for about 22 years now, since completing my final training. I guess if you account for all the time spent working after graduating from medical school, it would be 30 years.

How do you juggle your personal life with your career? Was this a challenge during your training? Is this a challenge now?

In as driven a bunch of people as surgeons, this is always

an issue. Balancing personal and professional lives is definitely a challenge and, I think an important distinction that helps in this balance is remembering not just to focus on what's urgent but also what's important. We all have a tendency to divert our focus on what immediately requires our attention but it is just as essential, I believe, to focus on the finer and more important areas of our lives. For me this includes family, teaching, and the well-being of my faculty. I especially make sure to think about and pay attention to my family every day. I can't imagine a day I don't text-message my daughters. You just can't always allow the urgent to dominate.

As a medical student, what motivated you to pursue surgery as your specialty? Why pediatrics?

When I entered medical school, I didn't know what I wanted to specialize in. In my clinical years I thought I might be interested in cardiology so I pursued a "selective" in cardiac surgery, hoping it'd be a good opportunity to learn more about cardiology. This, however, led to a newfound interest in pediatric cardiac surgery which ultimately led to my final choice: general pediatric surgery. I think all of us experience an "evolution" in our reasoning which ultimately guides us to the right specialty.

Why did you go into academics?

I think academic medicine combines the best of all worlds. It allows me to engage in thorough clinical practice (like other physicians in private practice) yet also offers much more than that. It allows me to surround myself with bright people asking the right questions and provides me with "surrogate" children (my residents) who inspire me and force me not to cut corners and get lazy. On top of this, working in academics gives me the ability to help shape and possibly better the field of surgery.



The Da Vinci Robot: the future of surgery?



Sean Sachdev

What kind of advancements do you envision in surgery twenty years from now? Is robotics a part of this future?

It would be really hard to predict what might happen in a field as dynamic as surgery twenty years from now. Let's consider just general advancements made recently: could anyone predict iPods or Google Earth twenty years ago? A better time frame to consider this question might be in the three-to-five year range and even then the possibilities are immense. I think, though, that tissue substitutes and tissue engineering may very well be a part of surgery in the future. Robotic surgery and its ongoing advancements are very much happening now, in the present.

In a question-and-answer session with Dr. Thomas Starzl (set up by Dr. Oscar Salvatierra), an interesting discussion arose among students in which we discussed how breakthrough advancements in surgery might be hampered by the natural tendency of skilled surgeons to resist deviating from a proven surgical method or protocol. What do you think might be the roadblocks to advancement in surgery today?

I would say: a sense of tradition, a narrowly focused education, conventional wisdom and a life spent not talking to others outside the field. I think it's easy to become too comfortable in one's own expertise, leading to an environment that can lack innovation. Imagine a case in which two experts, rigorously trained in the same field, face a new problem—they will probably come up with the same or similar solutions. But, then, alternatively, imagine a scenario in which experts from different fields collaborate in solving the same problem. How would this be different? A new and better solution might result. Similarly, it's important to provide a means of challenging what has already been established and accepted. In our surgery training program, we have instituted an atmosphere that allows questioning the accepted; for example our fellows are encouraged to consider themselves equivalents and are always assured a safe right to question experts around them.

Do you have any advice for medical students?

Work hard and stay curious!



H&P

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