



Society for Pediatric Pathology Awards Bulletin

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2006 Resident Recruitment Awards

In 2002, the Society for Pediatric Pathology established the Resident Recruitment Award (formerly called the Resident Case Presentation Award), which invites residents to compete for an expense-paid opportunity to attend the interim meeting. The award recognizes residents whose applications demonstrate interest in pediatric pathology and insight into the unique aspects of our exciting profession. Each year, two or three residents have been selected from approximately twenty residents who submit applications. The application process invites almost any format that fits on a single page and submissions have included artwork, crossword puzzles, personal essays, traditional case reports, and poetry.

In 2006, three Resident Recruitment Awards were presented to Drs. Mandolin Ziadie, Jochen Lennerz, and Daniel Fajardo. Their entries appear in this inaugural issue of the Society for Pediatric Pathology Awards Bulletin. In different ways, each captures a youthful perspective of the field of pediatric pathology.

- Raj P. Kapur

2006 Resident Recruitment Award Recipients



Daniel A. Fajardo
University of Texas Southwestern
Medical Center, Dallas, TX



Jochen Lennerz
Washington University in St.
Louis, St. Louis, MO



Mandolin S. Ziadie
University of Texas Southwestern
Medical Center, Dallas, TX

2006 Resident Recruitment Awards - Winning Entries

New Year's Day Autopsy

Daniel Adrian Fajardo, University of Texas Southwestern Medical Center

It was New Year's Day and as luck would have it I was on call for autopsy. I was not looking forward to ringing in the New Year by spending a day in the morgue, little did I know what I had initially greeted with displeasure would have such an impact on my education and future career goals. From what I was told over the phone, I knew it was case of Marfan syndrome. I was well aware of Marfan in adolescents and adults and I was even able to recall that death most often occurred as a result of aortic dissection. What puzzled me was that decedent was only 3 months old. From the brief history that was available I learned that her diagnosis was made prenatally. She was delivered by caesarean section due to fetal distress and spent her first two months of life in the intensive care unit. Echocardiograms showed regurgitation of all four cardiac valves, mitral valve prolapse, a patent foramen ovale with bidirectional shunting, and a markedly dilated aorta. Treatment was primarily to optimize cardiac function. She was discharged home on multiple medications and on the day of her demise she had been irritable and suddenly became unresponsive. She was taken to the hospital but all resuscitative efforts were unsuccessful.

I entered the morgue with all my gathered information and with a curiosity of the severity of this disease that I had only previously encountered in adolescents and young adults. On examination of the decedent several morphologic features of Marfan syndrome were recognizable; she was long and slender with a height of 61.9 cm (>95th percentile) and a weight of 5.4 kg (< 3rd percentile), had down-slanting palpebral fissure, high arched palate, and elongated digits. On the internal examination, her heart occupied a considerable portion of her thoracic cavity. The heart weighed 93.1 grams when the normal weight of a heart in a 3-month old should be 30 +/- 7 grams. All chambers were dilated and all the valves were diffusely thickened, with extensive thickening of the AV valves. The circumferences of the valves were as follows: aortic valve 15 mm (expected 6.5-8.9 mm), pulmonary valve 50 mm (expected 7.6-12 mm), mitral valve 20 mm (expected 10.9-16.2 mm), and the tricuspid valve 20 mm (expected 12.1-19.3 mm). The aortic root was markedly dilated with a diameter of 2.7 cm (expected 0.7 cm). Histologic sections of the cardiac valves showed them to be thickened with an accumulation of myxoid material. A similar accumulation of myxoid material was also present in the tunica intima of the abdominal aorta. Sections of the lung had areas of overexpansion. No other significant pathologic findings were present.

From the literature I soon discovered that clinical spectrum of Marfan varies in severity. Although in all cases, Marfan syndrome is present at birth, the severity of the manifestations may differ. The one I was most familiar with was the classical Marfan whose most severe symptoms do not present until adulthood. However, in some cases severe forms of Marfan syndrome may present at birth. Another form is congenital or neonatal Marfan that always presents with severe symptoms at birth or in utero. In this case several features were consistent with the neonatal form. The presence of pulmonary emphysema and tricuspid insufficiency are symptoms commonly present in congenital Marfan but not in severe Marfan presenting at birth. Furthermore, all cases of neonatal Marfan syndrome have a dilated aorta and mitral valve prolapse which were both present in this case. Differentiating between neonatal and severe Marfan presenting in infancy was important since neonatal Marfan is always the result of a sporadic mutation while classical Marfan only results from a sporadic mutation 25-35% of the time. So even though we were not able to determine the precipitating event that resulted in her decompensation that eventually lead to her demise, we were able to offer some comforts to the parents by stating that this was a case of neonatal Marfan syndrome that resulted from a sporadic mutation and would not be expected to recur in subsequent pregnancies.

As a medical student I often heard pediatricians say that a child is not a small adult, I soon realized pediatric pathology is not pathology in miniature. A disease that I had come across often in my short career and thought I knew, presented completely different in a neonate. I had inadvertently been introduced into the world of pediatric pathology. A world I had not imagined before. The malformations, the differing histology with development, pediatric predominant malignancies and genetic conditions are areas specific to pediatric pathology. We are else can one see the afflictions of life from the beginning (placentas, perinatal pathology) and as sad as it may sometimes be, the end (autopsy)? It is ironic that on New Years Day, a day when millions of people make resolutions would cause me to rethink my career goals and make a resolution of my own, to become a pediatric pathologist. I have always enjoyed pathology, pathology in general interests me, but pediatric pathology fascinates me.

2006 Resident Recruitment Awards - Winning Entries

The Kids are Our Future

Jochen Lennerz, Washington University in St. Louis

What's so special about pediatric pathology ?

DIAGNOSIS and the **FUTURE** of individuals



Danielle* is currently in remission from her original diagnosis of Pleuropulmonary Blastoma (PPB) Type III in May 2001. PPB was first recognized in 1988 and demonstrates the dynamic of Pediatric Pathology.

Will the understanding of the involved molecular genetics in pediatric tumors bridge neoplasia and key developmental questions ?

The **VARIETY** in the field of pediatric pathology is reflected by direct interaction with clinical colleagues and life-time learning

The application of **MORPHOLOGY**



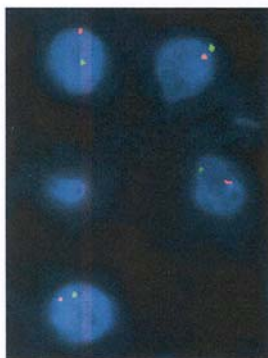
A ten-year old girl with cardiomyopathy required heart transplantation. During the microscopic evaluation of the explant, a trichrome stain highlighted remarkable fibrosis (blue). Image 60x. Quantification of an age-matched control group was performed to verify this impression.

Is the deposition of collagen meaningful in patients with Cardiomyopathy?

The Kids Are Our Future

Utilize **MOLECULAR BIOLOGY**

Answers in pediatric pathology often require complex methods and their reasonable application



During the microscopic examination of a placenta, one nodule of clear cells was identified. These cells, a rare incidental finding, are heterotopic adrenal cells. To prove fetal origin Fluorescent In-Situ Hybridization for the sex-chromosomes (X red, Y green) was performed. All heterotopic cells showed a male chromosomal pattern and thereby fetal origin [100x, DAPI counterstain]

What was the underlying migration pathway ?

Participate in **DEVELOPMENT**

Pediatric Pathologist face the wonders and horrors of life and are asked complex questions with momentous answers.

Dissecting scope image of Agar embedded Human Embryo (~5 weeks); no external abnormalities

Isn't it amazing that we all looked like this?



Diagnosis means „by knowledge“ and pediatric pathology requires serious commitment to gain this essential knowledge of normal and abnormal, of important and incidental findings. Pediatric pathology ties in molecular developmental biology and morphological diagnosis.

* Consent for publication acquired

2006 Resident Recruitment Awards - Winning Entries

The Privileges of Pediatric Pathology

Mandolin S. Ziadie, University of Texas Southwestern Medical Center

I sighed as I paged through the thick medical chart. It was my last week on the autopsy rotation and I was stumped by the complicated case unfolding before me. The patient was a male infant born two weeks prior after an unremarkable pregnancy, labor and delivery. A few hours after birth, he developed severe hypoxemia that required intubation and mechanical ventilation. The only abnormal clinical finding was a left anterior pneumomediastinum with densities throughout the lung fields. A tube thoracostomy, endotracheal intubation with high flow oxygen ventilation, nitric oxide administration and alkalinization were unsuccessful in maintaining adequate oxygen saturation; extracorporeal membrane oxygenation was required to stabilize him. However, his condition continued to decline and he soon developed anuric renal failure, intracerebral hemorrhage, refractory hypotension and significant pulmonary hypertension with right-to-left shunting. Because of his markedly diminished neurologic function, his parents made the difficult decision to wean him from pressor and ventilatory support. He died shortly thereafter.

Reading the death note, I could feel the frustration of the clinician who was faced with the many questions posed by the patient's distraught family. What had been wrong with this patient to cause his pulmonary failure? No clinical findings could explain his condition. Confronted with the sense of inadequacy that was conveyed by his note, I felt eager to begin the autopsy. This case was very unlike the majority of my autopsy cases, which had primarily been adult patients with prior diagnoses. Stretched in front of me was an essentially blank chart, waiting for me – me! - to make the final diagnosis. Could I? Suddenly, my hands grew clammy and my heart rate rose. My autopsy findings would likely determine whether the physician would be able to answer the family's many questions or would be forced to leave them with no answers at all. I couldn't miss anything!

The autopsy revealed adequately-sized but edematous lungs that were free of consolidation. Histologic sections showed a simplified alveolar architecture with thick septa, dilated lymphatic channels and intra-alveolar capillaries separated from the alveolar epithelium. Large, anomalous pulmonary veins accompanied the pulmonary arteries in the bronchovascular bundles. The muscular layers of the pulmonary arteriolar and arterial walls were markedly thickened. These findings are classic for alveolar capillary dysplasia. In addition, the patient had posterior urethral valves, incomplete fixation of the large bowel and massive temporal, parietal and occipital lobe hemorrhagic infarctions.

Alveolar capillary dysplasia is one of a few rare congenital malformations associated with persistent pulmonary hypertension of the newborn. The disorder is a developmental anomaly of the pulmonary vasculature that clinically presents with severe hypoxemia within a few hours after birth. Chest x-rays show mild nonspecific haziness (and, in some cases, pneumothorax) [1]. The mortality rate is 100% [1]. Unfortunately, as in this case, the diagnosis is rarely made prior to autopsy. The microscopic features described above are typical, as are the presence of multiple congenital anomalies involving the gastrointestinal, genitourinary and cardiovascular systems [2].

My heart went out to the patient's parents as I wrote my autopsy report. Losing a child is one of the most horrendous experiences parents can face. How much more difficult it could be when there were lingering questions about the reason for that death. I couldn't imagine what the parents felt as they awaited answers from the physician. Armed with my report, he would be able to answer their questions and, hopefully, ease their pain. I felt grateful for the opportunity to be a part of that interaction. I'll never see their faces and will never know how they coped through this tragedy, but knowing that, because of my autopsy, they would not be left with lingering questions was a tremendously fulfilling thought. Although all pathologists, including adult and pediatric pathologists, play a similar role in answering seemingly unanswerable clinical questions, I believe that the pediatric pathologist's role is unique. Like all pediatric specialists, pediatric pathologists are a part of a team treating not only the child but also his parents and guardians. By providing answers to puzzling questions, the pathologist can help an entire family understand and come to terms with situations involving their child. What a far-reaching impact one single diagnosis can have! Being a part of that interaction is a privilege that makes pediatric pathology an extraordinarily rewarding and unique practice.

References:

1. Tibballs J, Chow CW. Incidence of alveolar capillary dysplasia in severe idiopathic persistent pulmonary hypertension of the newborn. *J Paediatr Child Health* 2002; 38:397-400.
2. Alameh J et al. Alveolar capillary dysplasia: a cause of persistent pulmonary hypertension of the newborn. *Eur J Pediatr* 2002; 161:262-262.