The Death of a Young Pathologist in 1890

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IN ADDITION TO COLLECTING ARTIFACTS, another mission of the Sierra Sacramento Valley Medical History Museum is to preserve oral histories of how early doctors battled diseases.

Last summer, curator Dr. Robert LaPerriere received a phone call from Mrs. Jean Di Cristoforo, RN (Stanford, '45) of Sacramento concerning a microscope and some pathology slides passed down to her from her paternal grandfather, Dr. Frederick Osborn Lloyd.

Rembrandt painting "Anatomy Lesson of Dr. Nicolaes Tulp."

He had graduated from Columbia College of Physicians and Surgeons around 1880, and then practiced as a pathologist in upstate New York. In this capacity, he apparently lectured to students around autopsy cadavers in a manner said to have been similar to Rembrandt's famous painting of the anatomy lesson of Dr. Tulp.

One day in 1889, as he was dissecting a victim of miliary tuberculosis, a crowd bumped against him and Dr. Lloyd was accidentally cut "rather deeply."

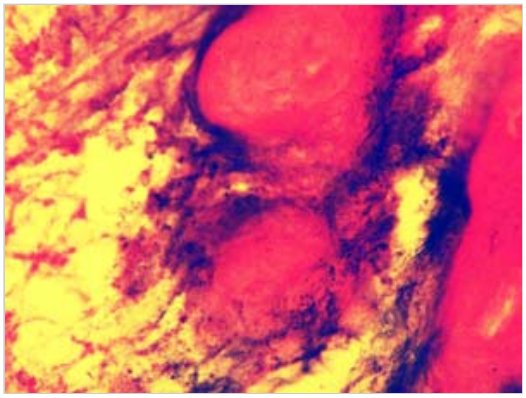
He carefully made, labeled and dated a pathology slide of tissue taken from this cadaver. Not very long thereafter, he was stricken with tuberculosis, reportedly also of a miliary type, and he died about a year later at age 32.

He had maintained the hematogenous inoculation he received was the causal agent of his illness. After he died, his widow and young son (Mrs. Di Cristoforo's father) were diagnosed with tuberculosis apparently contacted from him. They were treated at the Trudeau Sanatorium at Saranac Lake, New York, for about a year before being released, much improved.

The slide, which has been in the family's hands for 118 years, has never been examined by another pathologist, nor has there been any modern-day evaluation of Dr. Lloyd's story of the accident leading to his death.

It is eerie to look at a slide labeled "February 25, '89" probably as the first pathologist to review this case since Dr. F.O. Lloyd over a century ago. The borax-carmine stain is still vibrant after all these years. Somehow fittingly for an 19th century stain, the primary ingredient, cochineal extract, is derived from Dactylopius coccus, a parasite of cacti in tropical and subtropical areas of South America. A variation of the borax-carmine stain known as Grenacher's stain still is used to stain parasite cyst forms.

This is the slide that Dr. Lloyd prepared in 1889.



Miliary Tuberculosis - A close-up of a slide prepared nearly 120 years ago clearly shows granulomas (the two red areas in the center) typical of miliary tuberculoses. To the right is a blood vessel.

Caseating granulomas - typical for tuberculosis - are seen at low magnification and represent a typical histologic pattern of miliary tuberculosis. Tubercule bacilli cannot be seen with Grenacher's stain. The tissue is thick, probably about 20-30 micrometers. Normal lung alveoli and few pigmented pulmonary macrophages can be appreciated between the tubercules. A pulmonary vessel, probably an artery, is unremarkable.

The presence of normal lung parenchyma with minimally pigmented pulmonary macrophages suggests that the autopsy subject was a non-smoker and also likely a young person. Thickness of the specimen and fading of cellular detail impedes further evaluation.

Tuberculosis was a scourge of the United States during the 1800s (see Dr. Irma West's article in the previous issue), which were momentous times for infectious disease pathology. Robert Koch established in 1882 that a bacillus was the cause of tuberculosis, and he eventually received the Nobel Prize for his tuberculosis research.

Owing to high lipid and wax content, staining of acid-fast bacilli requires heating or prolonged application of powerful dyes. Koch used an extended incubation of alkaline mixtures of aniline dyes to label the tubercule bacillus in tissue. Ziehl in 1882 demonstrated an improved acid-fast stain in which an acidic dye produced improved staining with limited incubation. A modification of this stain is still in use today.

Miliary tuberculosis - so-called in that the lungs appear seeded with millet seeds - comprises about 1 percent of cases of tuberculosis.[1] The disease results from hematologic seeding of acid-fast bacilli (AFB), often as a result of an infected lymph node draining into a vein. Infected blood, after circulating through the heart, may lead to multiple seeding of the lungs as well as other organs.

Could an infected cut during an autopsy transmit tuberculosis? Certainly, but the development of miliary tuberculosis in the recipient seems unlikely. It is doubtful that sufficient AFB could gain access to circulation during a cut to result in miliary dissemination; it would instead produce granulomatous disease at the site of the cut.

More likely, tuberculosis could have been transmitted during an autopsy through inhalation of AFB. The delicate manipulation of tissue required for this slide preparation could have facilitated infection.

The Johns Hopkins Hospital performed frozen sections with autopsies in 1900 and probably earlier (*Archives of Pathology* 2008 vol 132:261-2264). Dr. F.O. Lloyd may have used this technique to prepare his post-mortem slides. Propelling frozen tissue containing AFB into the air is a most efficient means to spread tuberculosis among pathologists. For this reason, frozen section cryostats must be disinfected frequently.

Dr. Lloyd died of tuberculosis, but probably not of the miliary type. Chances are he was infected because of his work as a pathologist and teacher, unaware of a danger in the air he breathed.

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1. Miliary tuberculosis evokes an image of the radiologic appearance of lung studded with radio-dense nodules. But this term was likely developed earlier to describe the autopsy appearance of the affected lung, as was noted by Dr. F.O. Lloyd. The first medical x-ray was performed in 1895, six years after this event.

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