

# A Return to the Past: The Vital Importance of Autopsies for Infectious Disease Practice in 2011

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**Abstract:** Introduction of clinical guidelines and algorithms, and technical advances in laboratory tests and imaging techniques have apparently improved diagnostic capabilities in infectious diseases substantially in the last three decades, and autopsies and post-mortem studies are seemingly unwarranted in nowadays infectious disease practice. Is this really true?

**Keywords:** Infectious diseases, Autopsies, HIV infection, Tuberculosis, Influenza virus infection.

A recently published autopsy study of 240 patients aged 20 to 45 years (median age 33 years, 44% males; 226 HIV-infected of whom 200 identified before death) dying after admission to either the medical or surgical ward at a public hospital (Edendale Hospital) in KwaZulu-Natal, South Africa, indicates otherwise [1]. Between October 2008 and August 2009, tuberculosis had not been clinically suspected in 40 culture-positive (respiratory tract secretions and lung, liver, spleen tissues collected by needle core biopsies) patients (39 HIV-infected) [1]. The top three leading inpatient diagnoses for these unsuspected *M. tuberculosis* culture-positive individuals had been: pneumonia/lower respiratory tract infection (25%), meningitis (18%), and gastroenteritis (15%) [1]. Is this the only example of the value of autopsies for infectious diseases diagnosis in recent years?

In a retrospective evaluation of 1,630 autopsies performed at Sacco Hospital, Milan, Italy in patients with AIDS who died between 1984 and 2002, invasive fungal infections were identified in 297 (18.2%) [2]. Of the fatal cases, 38 (36.9%) were characterised by missed antemortem diagnoses, 17 (45%) of which met the Goldman criteria [3] for class I errors (knowledge of the diagnosis before death would have led to changes in the management that could have prolonged the survival or cured the patient).

At a primary referral hospital in Switzerland, infectious diseases were erroneously diagnosed clinically in 12.9% of cases [4], and no significant changes in clinicopathological discordance rates were found over a 10-year period [4]. Endocarditis, miliary tuberculosis and myo-pericarditis were the main missed diagnoses [4].

In a retrospective evaluation of 288 autopsies performed in a university hospital in São Paulo, Brazil, 23% of clinical diagnoses of infectious diseases were wrong, accounting for 34% of all discordant cases [5]. Class I errors were detected in 4 cases (all missed diagnoses of bronchopneumonia) [5].

At Maputo Central Hospital, Mozambique, pyogenic bronchopneumonia, puerperal septicaemia, pyogenic meningitis, tuberculosis and *Pneumocystis jiroveci* pneumonia were frequent major errors (i.e., they had not been diagnosed clinically) in 139 women with pregnancy-related deaths between 2002 and 2004 [6]. And in a retrospective review of medical records and autopsy reports of all cancer patients who died in the Intensive Care Unit at Memorial Sloan-Kettering Cancer Center, New York City, and had an autopsy performed between 1999 and 2005, missed major diagnoses with potential impact on treatment and survival were noted in 26% of patients [7]. Opportunistic infections (viral, fungal, bacterial, and parasitic) accounted for 67% of these class I discrepancies [7].

Postmortem studies also advance our understanding of novel infectious diseases. Autopsy tissue samples obtained from 100 US deaths with laboratory-confirmed 2009 H1N1 influenza virus infection allowed to establish that viral pneumonia (with viral antigens predominantly in the lung parenchyma) in association with diffuse alveolar damage were prominent features of infection [8].

In an era of sophisticated diagnostic tools and algorithms and overconfidence in diagnostic capabilities, the diagnostic process has unfortunately largely become a sum of steps, rather than being based on clinical acumen, experience and intuition. At the same time, fear of malpractice litigations, disapproving attitudes of the relatives and (in developing countries) low number of pathologists and scarce financial resources have enormously reduced the rate of autopsies the world over. Available data show that necropsy has a major role to play in infectious disease practice both as a method to detect diagnostic errors and a source of knowledge to be applied to future cases. It can influence learning and also add relevant data on local epidemiology of diseases especially in developing countries, where morbidity and mortality conferences need to be implemented or reinforced in teaching and in referral hospitals. The four necessary conditions for necropsy to be a valid monitor of clinical diagnosis performance need to be met: a high necropsy rate, specified and stable conditions of autopsy procedure (extent of organ assessment and sampling, availability of clinical

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information), calculation of sensitivity and specificity, and estimate of the errors in postmortem diagnosis [9]. Pathologists have much to offer to infectious disease specialists worldwide: let's ask them to perform autopsies!

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