



UTILITY OF MINIMALLY INVASIVE TISSUE SAMPLING AUTOPSY IN ESTABLISHING THE CAUSE OF DEATH AMONG PATIENTS FOLLOWING SHORT-TERM HOSPITALIZATION AT A TERTIARY HOSPITAL IN NORTHERN TANZANIA

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ABSTRACT

Background and aims: In sub-Saharan Africa, information on the cause of death remains inadequate because of poor access to health care and the limited availability of diagnostic tools. Patients who die shortly after hospital admission are unlikely to be thoroughly investigated, and the causes of death in these scenarios may not be correctly documented. A complete diagnostic autopsy examination remains an important tool to ascertain the causes of death. Minimally invasive tissue sampling (MITS) is a potential alternative to complete autopsies, which can aid in the ascertainment of causes of death, particularly in settings with limited access to diagnostic testing during life. We assessed the role of MITS in establishing the cause of death in Tanzania.

Methods: A hospital-based study was performed from January 2020 to February 2021 at Kilimanjaro Christian Medical Centre. The study subjects were 100 adults and children decedent patients who died within 3 days of hospital admission in internal medicine, emergency medicine, or pediatrics departments. The MITS procedure was performed within 48 hours of the death. Microbiology and histopathology MITS postmortem samples of nasal swabs, blood, cerebrospinal fluid (CSF), brain, liver, lungs, rectum, and other suspicious lesions encountered during the procedure were collected and analyzed. Each case was individually adjudicated for cause of death by a panel of multidisciplinary experts. The strength of the evidence in classifying the final cause of death was categorized into strong, moderate, slight, and none based on the pathological and microbiological results

(Table 1)

Level	Evidence	Pathology findings	Microbiology findings
0	None	No pathological findings, or nonspecific changes	No microorganisms identified
1	Slight	Mild pathological findings, unlikely to be the cause of death	Microorganisms that are frequent contaminants
2	Fair	Mild pathological findings, possibly causing death	Microorganisms that can represent true pathogens or colonization/contaminants; mixed infections
3	Moderate	Pathological findings of moderate intensity, probably causing death	Microorganisms that can represent either true pathogens or colonization contaminants detected by both molecular and culture-based methods
4	Strong	Severe pathological findings likely to be the cause of death	Microorganisms that represent true pathogens and/or microorganisms consistently detected in multiple samples

Table 1: Strength of evidence of the autopsy findings in classifying the final cause of death

Results: Sample adequacy was nasal swab (100%), brain (100%), liver (100%), lungs (98%), blood (98%), and CSF (96%). The immediate causes of death were infectious diseases (78), malignancies (12), and undetermined (10), respectively. Of the infectious causes, 47% were disseminated (sepsis), while 31% were localized. Streptococcus pneumonia (23%), Staphylococcus aureus (20%), and Klebsiella pneumoniae (19%) were the leading infectious causes of death. Malignancy causes of death included the liver (6), lung (2), hematolymphoid (2), brain (1), and skin cancers (1), respectively. MITS confirmed 76% of ante-mortem causes of death, disapproved 14%, while in 10% of the cases, MITS was unable to identify the cause of death,

Table 2.

SEX	N (%)	Adequacy	N%	Death causes	N %	Infectious cause	N%
Male	53	Brain	100	Infections	78	Disseminated/sepsis	47
female	47	Lungs	98	Malignancies	12	Localized	31
AGE		Liver	100	Undetermined	10		
≤5	11	Blood	98			Streptococcus pne	23
6-19	12	CSF	96	Malignancies		Staphylococcus aur	20
20-29	27	Rectal swab	100	Liver	6	Klebsiella pne	19
40-59	26	Others	60	Lung	2	Others	16
60+	24			Hematolymphoid	2		
Hospt stay		HIV status		KS	1	Agreement level	
≤1	67	Positive	14	CNS	1	Concordance	76
2	13	Negative	86			Discordance	14
3	20	TOTAL	100			Undetermined	10

Table 2: Key findings.

Conclusions: Our study findings suggest that histopathology and microbiology samples obtained via MITS autopsy are capable of identifying the etiology of most deaths. MITS, which is simpler and more readily acceptable than the more invasive complete autopsy, can provide robust data for cause-of-death surveillance, especially in limited-resource settings, that can be essential for improving patient survival.

Keywords: minimally invasive tissue sampling, cause of death, short-term hospitalization, Tanzania.

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