

Mortality with necropsic verification at the Emergency Service of the «Hospital Joaquín Albarrán»

Isnerio Arzuaga Ánderson^{1,2}✉, MD; Laynes Savón Martín^{1,2}, MD; Daisy Ferrer Marrero³, MD, MSc; Digna Chávez Jiménez^{1,2}, MD; Lourdes Palma Machado^{1,2}, MD; Cristian E. Pilco Allauca⁴, Std.; Cindy P. Mejía Rojas⁴, Std.; and Lourdes V. Tenelema Chinlli⁴, Std.

¹ Department of Pathological Anatomy, Hospital Clínico-Quirúrgico Docente Joaquín Albarrán. Havana, Cuba.

² University of Medical Sciences of Havana. Havana, Cuba.

³ Facultad de Ciencias Médicas Victoria de Girón. University of Medical Sciences of Havana. Havana, Cuba.

⁴ University of Medical Sciences of Havana. Havana, Cuba.

Este artículo también está disponible en español

ARTICLE INFORMATION

Received: April 18, 2017

Accepted: May 18, 2017

Competing interests

The authors declare no competing interests

Acronyms

AMI: acute myocardial infarction

EICU: Emergency intensive care unit

On-Line Versions:

Spanish - English

ABSTRACT

Introduction: The importance of the autopsy is recognized as a quality audit of diagnoses.

Objective: To describe the characteristics of mortality with necropsic verification at the Emergency Service of the Hospital Joaquín Albarrán, considering the relationship of diagnostic coincidence of the direct and basic causes of death.

Method: A retrospective longitudinal descriptive observational study was conducted during a semester. Autopsies' protocols and clinical histories were reviewed, demographic data were analyzed, as well as clinical diagnoses, of autopsy, and their coincidence. The Microsoft Excel programs and the EPI-Info statistical system were used.

Results: In the second semester of 2016, 331 patients died in this hospital, 117 of them at the Emergency Service and 95 (28.7%) underwent clinical autopsy. There was a predominance of males, between 60 and 69 years of age, in the Emergency Intensive Care Unit. The acute myocardial infarction was the most frequent direct cause of death, being the atherosclerotic disease, the basic cause.

Conclusions: There exist diagnostic quality problems. There is reaffirmed the importance of the autopsy as a source of information that is transmitted to health statistics and as an audit resource in the primary health care.

Key words: Mortality, Hospital emergency service, Diagnostic self-evaluation, Cause of death, Autopsy

Mortalidad con comprobación necrósica en el Servicio de Urgencias del Hospital Joaquín Albarrán

RESUMEN

Introducción: Se reconoce la importancia de la necropsia como auditoría de calidad de los diagnósticos.

Objetivo: Describir las características de la mortalidad con comprobación necrósica en el Cuerpo de Guardia del Hospital Joaquín Albarrán, y considerar la relación de coincidencia diagnóstica de las causas directas y básicas de muerte.

Método: Se realizó un estudio observacional, descriptivo, longitudinal y retrospec-

✉ I Arzuaga Ánderson

Hosp. Clínico-Quirúrgico Provincial Joaquín Albarrán. Avenida 26 y Línea del Ferrocarril. Nuevo Vedado, Plaza de la Revolución, CP 10600. La Habana, Cuba. E-mail address: isnerioval@infomed.sld.cu

tivo durante un semestre. Se revisaron los protocolos de necropsias e historias clínicas, se analizaron datos demográficos, así como los diagnósticos clínico, de necropsia, y su coincidencia. Se utilizaron los programas Microsoft Excel y el sistema estadístico EPI-Info.

Resultados: En el segundo semestre del año 2016 fallecieron en este centro hospitalario 331 pacientes, de ellos 117 en el Servicio de Urgencias y a 95 (28,7%) se les realizó necropsia clínica. Se evidenció un predominio del sexo masculino, entre 60 y 69 años, en la Unidad de Cuidados Intensivos de Emergencia. La causa directa de muerte más frecuente fue el infarto agudo de miocardio y la básica, la enfermedad aterosclerótica.

Conclusiones: Existen problemas de calidad diagnóstica. Se reafirma la importancia de la necropsia como fuente de información que se trasmite a las estadísticas de salud y como un recurso de auditoría en la atención primaria de salud.

Palabras clave: Mortalidad, Servicio de urgencia en hospital, Autoevaluación diagnóstica, Causas de Muerte, Necropsia

INTRODUCTION

Different health systems have been implemented at international surrounding, that presuppose the primary objective of prolonging life in quantity and quality; therefore, death implies a higher rate of failure. By means of the autopsy, which studies the cause of death, an evaluation of the quality of the work that the doctor provides to the population is obtained. Since the last century, it has been the method by which this evaluation is carried out, since it allows a complete study of the patient and the disease, as well as the guarantee of the medical assistance's quality¹⁻⁴.

For the autopsy to have value it must be made with the highest quality, what means that the procedure is adequate and provides as a result, a report that would give the conclusions of the particular case, and then it will contribute to the data registration and control, which in Cuba are managed through the SARCAP (from Spanish: *Sistema Automatizado de Registro y Control de Anatomía Patológica*), created and implemented by the Cuban health system, which facilitates knowledge of clinical and anatomopathological diagnoses; and, especially, the cause of death (direct, intermediate, basic and contributory), as well as the diagnostic match or discrepancy^{4,5}.

Through clinical autopsies, several analytical work and research on mortality can be developed, as well as the different diseases affecting the population that is assisted at the Emergency Medical Service. Thus, conclusions can be reached about which are the direct and basic causes of death presented in a population and their relation to demographic vari-

ables, what allows to identify if at a certain level of medical care there is a failure that generates an increase in the presentation of these causes of death, and from that, to design strategies that can reduce their impact on the population. In the revised studies on deaths at the Emergency Service, there seems to be a current trend that patients come to die to the hospital with degenerative and terminal diseases, with poor quality of previous life, therefore, they need more palliative than curative medicine^{1,5-9}.

Because of the paucity of data validating the correlation between clinical and anatomopathological diagnosis, it has been decided to describe the characteristics of mortality with necropsic verification at the Emergency Service of the *Hospital Joaquín Albarrán* (Havana, Cuba), during the first semester of 2016.

METHOD

An observational, descriptive, retrospective study was conducted at the *Hospital Docente Clínico-Quirúrgico Joaquín Albarrán Domínguez*, of Havana, Cuba, during a semester (July to December 2016). The deceased adults, of any sex and age, were included, who received or did not receive out-of-hospital medical care or died in any of the hospital's emergency rooms, through which the medical certificate of death was processed.

The medical-legal autopsy cases were excluded; hence, the sample consisted of 95 deceased, from the inclusion criteria, of a total of 117 that make up the population under study.

For the collection of the information, there were

Table 1. Mortality with necropsic verification at the Emergency Service according to age and sex.

Age groups (years)	Sex				Total (n=83)	
	Male		Female		Nº	%
	Nº	%	Nº	%		
Less than 50	6	11,1	4	9,7	10	10,6
50 – 59	4	7,4	10	24,3	14	14,7
60 – 69	16	29,6	9	21,9	25	26,3
70 – 79	14	25,9	9	21,9	23	24,3
80 – 89	13	24,0	7	17,0	20	21,0
90 and more	1	1,8	2	4,8	3	3,1
Total	54	56,9	41	43,1	95	100,0

Source: Database.

used the registry book of the Department of Pathological Anatomy, reports of the autopsies from the months evaluated and medical records of the deceased at the Emergency Service, whom underwent the mentioned procedure *post mortem* that semester. Subsequently, the autopsy reports and the available clinical elements were reviewed to establish a database.

The variables studied were sex, age, origin, basic and direct cause of death, as well as the diagnostic match; this last, determined the total and partial clinical-morphological correlation, and the mismatch in both causes of death of the entire studied sample.

- Total match: It was considered when clinical diagnoses coincided with all the morphological ones.
- Partial match: When some of the morphological diagnoses were not reflected within the clinical ones.
- Mismatch: When none of the morphological diagnoses was raised as a result of clinical death. This category was also called discrepancy^{8,10}.

The database, developed on a Hewlett-Packard laptop, allowed the processing through the statistical program EPI-Info7, English version, with a confidence level of 95% and 5% error. A univariate analysis was performed by using descriptive statistics techniques to determine the distribution of the variables.

For the use of the documents, the authorization of the hospital management and the Department of Pathological Anatomy was requested. The principles of medical ethics, concerning the non-disclosure of

the doctors' names, the deceased patients, or errors encountered, not being part of the research, were taken into account.

RESULTS

In the second half of 2016, in this hospital died 331 patients, 117 of them at the Emergency Service and 95 (28.7%) of them underwent clinical autopsy.

The greatest number was encountered in the age group between 60 and 69 years (26.3%) (Table 1), predominantly in this age group (16/25) and generally (56.9%), of the male sex. The average age of the deceased was 69 ± 13.1 years, with a range between 43 and 94 years.

The highest number of deaths that comprises the sample (Table 2) is derived from the different rooms of the Emergency Service: Emergency Intensive Care Unit (EICU) (45.3%) and Emergency Service itself (33.7%).

Table 2. Mortality with necropsic verification at the Emergency Service according to the level of care to patients before death.

Level of care	Nº	%	CI 95%
EICU	43	45,3	35,0-55,8
Emergency Service	32	33,7	24,3-44,1
Polyclinic	12	12,6	6,7-21,0
None (residence)	8	8,4	0,6-17,9
Total	95	100	

When analyzing the deaths that make up the sample, according to the direct cause of death established in the autopsy, it is observed (**Table 3**) that the highest relative frequency of these deaths (28.4%) is linked to the acute myocardial infarction (AMI), a disease associated, with high frequency, to

Table 3. Mortality with necropsic verification at the Emergency Service according to the direct cause of death.

Direct cause of death	Nº	%
Bilateral acute bronchopneumonia	23	24,2
Pulmonary thromboembolism	5	5,3
Acute myocardial infarction	27	28,4
Terminal state of neoplasia	8	8,4
General sepsis	10	10,5
Intracranial hypertension	5	5,3
Acute respiratory failure	3	3,2
Severe cerebral edema	2	2,1
Hypovolemic shock	3	3,2
Acute pulmonary edema	2	2,1
Cardiac tamponade	1	1,1
Generalized fibrinopurulent peritonitis	1	1,1
Anoxic anoxia	1	1,1
Acute anemia	1	1,1
Not precise	3	3,2
Total	95	100

Table 4. Mortality with necropsic verification at the Emergency Service according to basic cause of death.

Causa básica de muerte	Nº	%
Malignant neoplastic disease	24	25,2
Atherosclerotic disease	54	56,8
COPD	3	3,2
High blood pressure	2	2,1
Other	7	7,4
Not morphologically defined	5	5,3
Total	95	100

COPD, chronic obstructive pulmonary disease.

the occurrence of sudden death. Next, in order of frequency, bacterial bronchopneumonia (24.2%) and sepsis (10.5%).

It is evident that the AMI, for this sample, is the most frequent direct cause of death, and it predominates in the male sex and in ages below 70 years (**Figure**); meanwhile, the bronchopneumonia does not show a predominance of sex, but it is more common in ages above 70 years.

The basic causes of death (**Table 4**) are grouped, for illustrative purposes, and they show that there is a high frequency of atherosclerotic disease, which corresponds to the high frequency of AMI, pulmonary edema and acute cerebrovascular disease, etc.

In **table 5** are exposed the percentages of diagnostic match or mismatch, where the relative frequency of mismatching results is high (57.9%).

Table 5. Mortality with necropsic verification at the Emergency Service according to diagnostic match.

Diagnostic match	Nº	%	CI 95%
Total match	26	27,4	19,1-38,4
Partial match	11	11,6	5,5- 15,6
Mismatch	55	57,9	47,3-67,6
Insufficient data	3	3,1	0,6-8,6
Total	95	100	

DISCUSSION

There was a considerable number of dead patients (28.7%) during the evaluated semester, at the Emergency Service of this institution, of which most are not discussed in the Hospital Mortality Committee, due to their short stay. This fact limits the optimal knowledge of the diagnoses' quality in the mentioned service.

The largest number of deaths in that period took place at the UCIE and between 60 and 89 years of age, regardless of the presentation form of death and its cause, with a fairly uniform distribution in each of the age subgroups with predominance in males for all groups, except that of 50-59 years old and more than 90 years of age, where the absolute and relative frequency of women is higher. These results coin-

cided with similar studies carried out in Spain^{9,11}, at the *Hospital Militar Central Dr. Luis Díaz Soto*, in Havana, Cuba¹⁰, in Villa Clara¹ and in Sancti Spíritus¹.

The result obtained from the level of care where death occurs indicates the urgency with which attention has been given to these patients, at different levels of the Emergency System; with a predominance of deaths at the UCIE, which reaffirms the accessibility to these services. However, it can be seen that even in the death cases at polyclinics and residences (out-of-hospital mortality), the request for clinical autopsy is not high, as an element of scientific quality and as a basis for mortality statistics; despite being registered in the content of the Ministerial Resolution Number 9 of the year 1992, of the Minister of Public Health.

At the EICU are assisted patients with very short stay. The promptness of the provided medical assistance allows the establishment of preventive measures to reduce mortality and facilitates the recovery of patients. The UCIE has specialized staff and resources that allows the most prolonged survival of patients; nevertheless, every day, one can confirm the care to patients in terminal state diseases, which makes greater the number of deaths^{9,10}.

In the analysis of the direct cause of death there is, logically, that the highest percentage of death of these patients, because of the sudden and unexpected situations, occurs in a short period of time, which explains that it is related to conditions such as acute myocardial infarction. The high frequency of bronchopneumonia as a direct cause of death may be related to the longevity of the population studied and the evolutionary characteristics that these respiratory infectious processes have in the elderly. The frequency of generalized sepsis is also of interest in 10.5% of the cases studied, since they are usually processes that, due to their evolutionary course, should demand medical attention of longer duration. These results are comparable to those presented by other authors^{1,4,5,7-11}.

When going deeper into the direct cause of death and its relation to sex and age, it was found that the

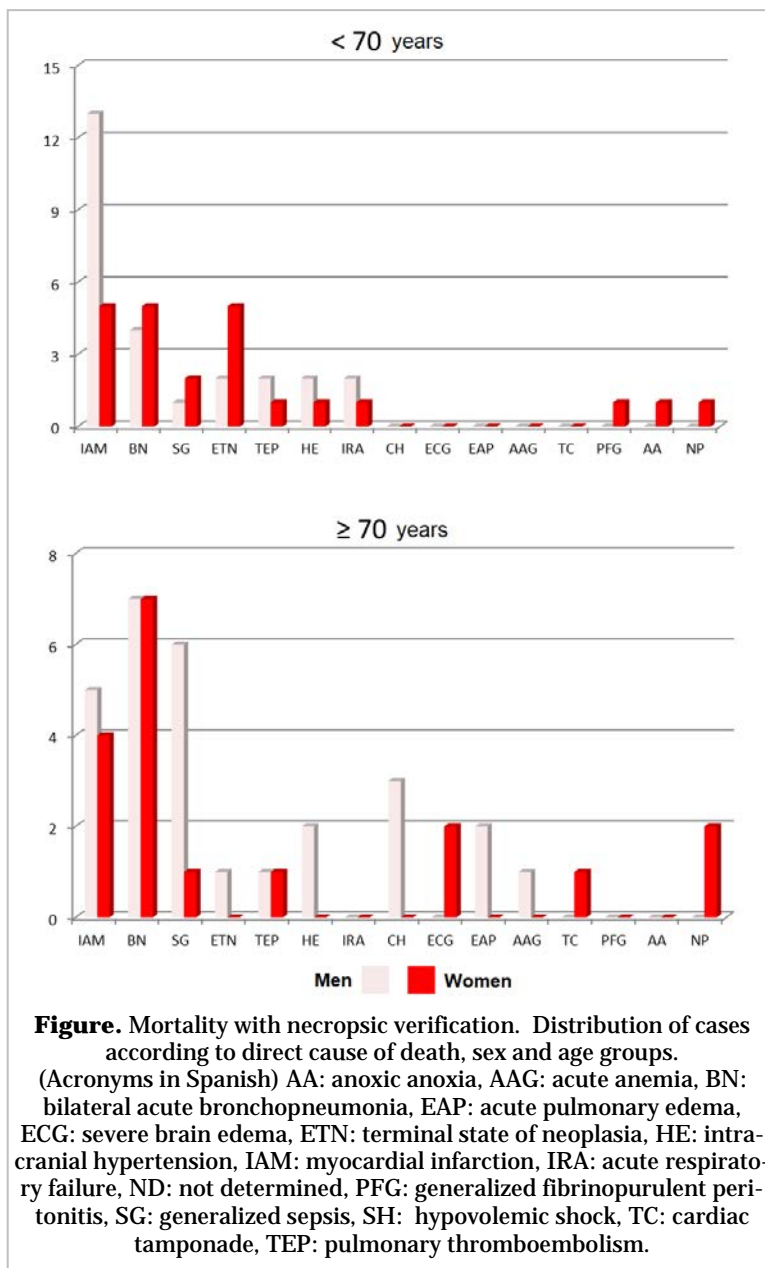


Figure. Mortality with necropsic verification. Distribution of cases according to direct cause of death, sex and age groups. (Acronyms in Spanish) AA: anoxic anoxia, AAG: acute anemia, BN: bilateral acute bronchopneumonia, EAP: acute pulmonary edema, ECG: severe brain edema, ETN: terminal state of neoplasia, HE: intracranial hypertension, IAM: myocardial infarction, IRA: acute respiratory failure, ND: not determined, PFG: generalized fibrinopurulent peritonitis, SG: generalized sepsis, SH: hypovolemic shock, TC: cardiac tamponade, TEP: pulmonary thromboembolism.

increased frequency of infarction in men is no different from the statistics for that kind of death; its greater frequency in ages below 70 years could be related to a lesser development of collateral circulation in these patients and greater influence of environmental and social factors. In the case of bronchopneumonia, without predominance of some sex, it is logical that it occurs in older ages, where aging is manifested as a natural process and more diseases that lead to prolonged bed rest and weakening of the immune system coexist⁹⁻¹⁶.

The results of the analysis of the basic causes of

death corroborate the multicausality attributed to the diseases, with a high weight in environmental and social factors, which ratify the need for working in the health area, at the primary care level; a place where greater influence can be exerted through education and health promotion, with preventive work and early recruitment, in order not only to avoid the disease but to reduce the risk and the seriousness of the complications¹³⁻¹⁷.

The analysis of the diagnostic match approach between clinical and autopsy findings demonstrates the utility of the latter method in the evaluation of the elements of diagnostic quality, an aspect which can be clearly improved. The existence of partial matches may be related to the non-dominance or non-use of the associated International Classification of Causes of Death and Morbidity. It should be commented that if both qualities of coincidence are considered (total and partial), they represent 39% of the total cases, a relative frequency that is not negligible for the health care system. The total match of 27.4 % and the discrepancy of 57.9 % differ from the national average and from the figures found by García Montero *et al.*¹⁰; this difference is probably due to the large number of deaths at the Emergency Department of the center and proper use of the diseases' international system of codification^{7,8,10,11}.

As the population studied and limited to this hospital center is reduced, the results obtained cannot be generalized; however, they contribute to a better understanding of diagnostic discrepancies and thus, to establish preventive measures to reduce mortality and facilitating patient recovery. However, more extensive studies are necessary in this field.

The importance of teaching the method implemented in the SARCAP, from the undergraduate students of the Medicine career, for its foundation in the Manual for the International Classification of Diseases and Causes of Death, is imperative, which enables the training to perfect the *pre mortem* diagnostics and to reduce the diagnostic match errors observed in this study.

CONCLUSIONS

There is correspondence between the acute myocardial infarction as a direct cause of death and atherosclerotic disease as a basic cause. There is also a large number of cases of diagnostic mismatch between both causes of death, what evidences the survival of problems of diagnostic quality and that

the information obtained from autopsy supports its usefulness in evaluating the quality of medical care, because it becomes an audit resource at all levels of health care, and results valuable to provide information to health statistics.

REFERENCES

1. González Valcárcel K, Hernández Díaz D, Pedraza Alonso NE. Compatibilidad entre el diagnóstico clínico y anatomopatológico en los servicios del Hospital Universitario Arnaldo Milián Castro. *Medicent Electrón* [Internet]. 2014 [citado 22 Ago 2016];18:163-70. Disponible en: <http://www.medicentro.sld.cu/index.php/medicentro/article/view/1396/1405>
2. Bürgesser MV, Camps D, Calafat P, Diller A. Discrepancias entre diagnósticos clínicos y hallazgos de autopsia. *Medicina*. 2011;71:135-8.
3. Verdú F. Autopsia clínica: Un necesario resurgir. *Gac Int Cienc Forense*. 2012;2:1-2.
4. Hurtado de Mendoza Amat J. Autopsia. Garantía de calidad en la medicina [Internet]. La Habana: Ciencias Médicas; 2009 [citado 22 Ago 2016]. Disponible en: <http://www.sld.cu/galerias/pdf/sitios/scap/librocompleto.pdf>
5. Hurtado de Mendoza Amat J, Álvarez Santana R, Borrajero Martínez I. Discrepancias diagnósticas en las causas de muerte identificadas por autopsias. Cuba 1994-2003. Primera parte. *Patol Rev Latinoam*. 2008;46:85-95.
6. Pedraza Alonso NE, Igualada Correa I. Correlación clínico patológica en autopsia. Estudios de dos años. X Congreso Virtual Hispanoamericano de Anatomía Patológica [Internet]. España: Sociedad Española de Anatomía Patológica; 2009 [citado 22 Ago 2016]. Disponible en: http://www.conganat.org/10congreso/trabajo.asp?id_trabajo=1950&tipo=2
7. Organización Mundial de la Salud. Clasificación estadística internacional de enfermedades y problemas relacionados con la salud (CIE-10). Vol. 2. Ginebra: OMS; 2009. p. 26-39.
8. Hurtado de Mendoza AJ, Álvarez SR, Borrajero MI. Discrepancias diagnósticas en las causas de muerte identificadas por autopsias. Cuba 1994-2003. Cuarta parte. *Patol Rev Latinoam*. 2010;48:3-7.
9. Rodríguez Maroto O, Llorente Álvarez S, Casanueva Gutierrez M, Álvarez Álvarez B, Menéndez

- Somoano P, de la Riva Miranda G. Mortalidad en un Servicio de Urgencias Hospitalarias. Características clínico epidemiológicas. *Emergencias*. 2004;16:17-22.
10. García Montero A, Quiñónez Zamora A, Gómez Sánchez A, Montero González T. Correlación anátomo-clínica de los fallecidos en la Unidad de Cuidados Intensivos de Emergencias. *Rev Cubana Med Int Emerg* 2003;2:9-14. Disponible en: http://bvs.sld.cu/revistas/mie/vol2_2_03/mie03104.pdf
 11. Santiago Guervos M, Muñoz Álvarez D, Rodríguez C. La mortalidad en el Servicio de Urgencias Generales del Hospital de Área de Ávila. Un estudio descriptivo. *Emergencias*. 1994;6:172-5.
 12. Ochoa Montes LA, Tamayo Vicente ND, González Lugo M, Vilches Izquierdo E, Quispe Santos JF, Pernas Sánchez Y, *et al*. Resultados del Grupo de Investigación en Muerte Súbita, 20 años después de su creación. *Rev Cubana Salud Pública [Internet]*. 2015 [citado 01 Sep 2016];41:298-323. Disponible en: <http://scielo.sld.cu/pdf/rcsp/v41n2/spu10215.pdf>
 13. Pérez de Corcho Rodríguez MA, Pérez Assef JJ, Sevilla Pérez B, Mayola Alberto CC, Díaz Mizos FA. Estrategia con enfoque comunitario para prevenir los factores de riesgo de muerte súbita. *Mediciego [Internet]*. 2011 [citado 01 Sep 2016];17: [aprox. 8 p.]. Disponible en: http://bvs.sld.cu/revistas/mciego/Vol17_01_%202011/pdf/T18.pdf
 14. Ochoa Montes LA, González Lugo M, Vilches Izquierdo E, Fernández-Britto Rodríguez JE, Araujo González RE. Muerte súbita cardiovascular en poblaciones de riesgo. *CorSalud [Internet]*. 2014 [citado 04 Ago 2016];6(Supl. 1):71-8. Disponible en: <http://www.corsalud.sld.cu/suplementos/2014/v6s1a14/pob-riesgo.html>
 15. Carter-Monroe N, Virmani R. Tendencias actuales en la clasificación de la muerte súbita cardíaca según los datos de autopsias: una revisión de los estudios sobre la etiología de la muerte súbita cardíaca. *Rev Esp Cardiol*. 2011;64:10-12.
 16. Ochoa Montes LA, Miguélez Nodarse R, Vilches Izquierdo E, Pernas Sánchez Y. El desafío mundial de la muerte súbita cardíaca en el nuevo milenio. Resumen de un estudio cubano. *CorSalud [Internet]*. 2012 [citado 04 Ago 2016];4:278-86. Disponible en: <http://www.corsalud.sld.cu/sumario/2012/v4n4a12/ms.html>
 17. Hurtado de Mendoza Amat J, Álvarez Santana R. Situación de la autopsia en Cuba y el mundo. La necesidad de su mejor empleo. *Patol Rev Latinoam*. 2008;46:3-8.