Injuries due to foreign body aspirations in Georgia: A prevention perspective

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Abstract

Background: Suffocation due to foreign bodies (FB) is a leading cause of death in children aged 0–3. No data from the former U.S.S.R. are available in the international scientific literature.

Methods: Consecutive patients admitted at the Iashvili Central Children Hospital in Tbilisi, Georgia from 1989 to 2011 were analyzed. Injuries in the upper airways due to foreign bodies' inhalation were collected and compared with the Susy Safe Registry and the pooled estimates of the meta-analysis.

Results: 2896 cases were collected. Distribution of injuries in children younger than 3 years was significantly higher than in the Susy Safe Registry and in the ''High-Income'' countries in the meta-analysis. Percentage of injuries due to organic objects (86%) was significantly higher than in published data.

Conclusions: Since Georgia is not showing any substantial difference, both in epidemiology and treatment of foreign bodies injuries, as compared to the other case series, translation of public health initiatives from other most advanced prevention experiences is possible and it is likely to be effective.

Level of evidence: Level V, Epidemiological case series.

What is known

- Foreign bodies injuries in children are heterogeneous in geographical and cultural terms.
- Development of international guidelines to avoid injuries needs local accurate epidemiological data.

What is new

- For the first time, epidemiology of foreign bodies injuries in Georgia is made available to scientists.
- The overlapping of Georgian data with Europe suggest that a common prevention is possible.
- An integration of Georgian data in the Susy Safe registry will allow continuous monitoring and surveillance of injures helping in promoting best practices.

1. Introduction

Foreign body (FB) injuries are a serious health problem in pediatric patients causing significant morbidity and mortality. FB injuries and adverse events are common among children, and are well known and documented [1]. In recent years, they have raised public health concern [2] being recognized as a burden both for the cost they impose on of the injured children and their families' quality of life and for their socio-economic impact [3]. Conversely, from the health care perspective, consequences are very heterogeneous, varying from death to lower impact disturbs, like inflammation [4]. Often, however, complications arise, sometime requiring hospitalization. The clinical aspects of identification, removal and treatment of complications have already been widely approached in the literature.

The rapid management is, without doubt, one of the main requirement when facing such injuries. In terms of primary prevention, the knowledge of features like shape, dimension, consistency of the objects causing

the injury, are fundamental in providing an evidence based education or legislation to avoid the injury or to lower the damage that might occur.

Although FB injuries are reported in case series worldwide, as pointed out in a recent review [5], no data coming from countries of the former U.S.S.R are available. To fill this gap, this paper presents the first case series ever published on the epidemiology of foreign bodies' injuries in Georgia, a former U.S.S.R country.

2. Material and methods

2.1. Sample

Data are a consecutive case series of children aged 0–14 referred, because of a foreign body injury in the upper respiratory tract, to the Iashvili Central Children Hospital of Tbilisi, Georgia from 1989 to 2011. Iashvili Central Children Hospital is a reference hospital for the Tbilisi area and for the Country, providing the largest emergency room facilities and respiratory medicine and surgery in the area. Appropriate ethical approval has been granted by the Iashvili Central Children Hospital of Tbilisi and has been performed according to the Helsinki Guidelines. Privacy has been ensured by anonymity of personal data treatment.

2.2. Statistical methods

Basic descriptive statistics, based on absolute numbers (and percentages) or median (I, III quartile) are computed. Whenever possible, 95% Confidence Intervals have been computed to allow a heuristic comparison with figures coming from the Susy Safe Database [6,7] and a recent meta-analysis [5]. Difference among Georgia and Susy Safe and published data have been based on the Chi-Square test. All analyses have been performed with the R System [8].

3. Results

Two-thousand-eight-hundred-ninety-six cases were collected from the Iashvili Central Children Hospital in Tbilisi, Georgia. Data are shown in Table 1. Frequency of injuries in children younger than 3 years was significantly higher than in the Susy Safe Registry and in the ''High-Income'' countries in the meta-analysis [5] ($p < 0.05$).

The majority of aspirated objects (86%) were organic in nature, mainly food (nuts, walnuts, sunflowers, watermelon and pumpkin seeds, bones parts, etc.) and significantly different from all other published data. The rest were non organic (parts of plastic toys, beads, small nails and needles). Percentage of injuries due to organic objects was significantly higher than both the Susy Safe and the meta-analysis case series.

Foreign bodies were removed with rigid bronchoscopy in 2491 cases (98.1%), not significantly different than in both the Susy Safe registry and in the meta-analytic estimates. In 34 patients (1.1%) the first bronchoscopy was unsuccessful, so it became necessary to perform the procedure a second time. In 21 (0.7%) patients with severe complications surgery was performed. In these 21 patients, lodgments lasted longer than 1 month, occurring foreign body migrations, bronchiectasis and abscess. In these patients, foreign objects were needles (11), bones (6) and grains (4).

4. Discussion

Foreign bodies are a frequent cause of injuries in children, occurring in our study mostly in children younger than 3 years old. The nature of foreign bodies varies from country to country and is dependent on diverse cultural, social, religious and economic factors that include parental attitudes, eating habits, availability and types of potentially threatening objects, and prevention strategies. In Georgia, the most frequent foreign bodies were organic objects with bronchial location, in agreement with studies stressing the importance of the activities that the children were performing when the injury occurred [9]. Access to endoscopy in

Georgia as a preferred removal technique is absolutely overlapped to that of major experiences in the world.

Surely, this study represents only a first step toward the in-depth Georgian study of the specific characteristics of foreign bodies associated with increased hazard [10], such as nature, size, shape, hardness or firmness, lubricity, pliability and elasticity, in order to better identify risky objects and to implement appropriate prevention campaigns aimed at reducing incidence of injuries and their overall burden [11]. Indeed, a major limitation of the study is the absence of quality data on the clinical management of the patient, timing of endoscopy and/or surgery and iatrogenic complications.

Noticeably, Georgia is not showing any substantial difference both in epidemiology and treatment of foreign bodies' injuries, as compared to both published literature and main international databases. This implies that most prevention initiatives, from surveillance up to communication and awareness campaigns, which have been promoted in Europe and worldwide [12], are most likely to be valid in Georgia as in most of the countries where such activities are implemented. Thus, this study shows that translation of public health initiatives from other most advanced prevention experiences, like in Europe or U.S. is possible and it is likely to be effective in Georgia.

Compliance with ethical standards

Funding The study received no specific funding.

Conflict of interest statement None to declare from all authors.

Ethical approval

The data collection has been conducted in compliance with the 1964 Helsinki declaration and its later amendments and after approval by the internal revisory board of the Tbilisi State Medical University. Being a retrospective, anonymous data collection, informed consent procedure was not applicable.

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Table 1 Comparison amongst sample size and distribution of injuries recorded in the Georgian case series with the Susy Safe study case series and the pooled data from the meta-analysis [5]. Data are given as absolute relative (%) frequencies. 95% Confidence Intervals of relative frequencies are also presented in brackets. The * indicates a statistically significant difference between Georgia and the other database ($p < 0.05$).

		N	%	95% CI		N	%	95% C.I		N	%	95% C.I		N	%	95%C.I	
Age	0–3	1767	61	(58.7;	63.3)	10036	49.8*	(48.8;	50.8)	2397	60	(47.0;	72.5)	843	75.0*	(64.0;	86.0)
	>= 3	1129	39	(36.1;	41.8)	10118	50.2*	(49.2;	51.2)	2230	29.0*	(22.0;	36.0)	464	21.0*	(16.0;	26.0)
Type	Organic	2491	86	(84.7;	87.4)	5734	28.5*	(27.3;	29.6)	13690	60.0*	(52.0;	67.0)	5379	52.0*	(45.0;	60.0)
	Inorganic	405	14	(10.6;	17.4)	14420	71.5*	(70.8;	72.3)	3706	25.0*	(19.0;	30.0)	2072	26.0*	(20.0;	31.0)
Removal	Endoscopy	2876	99.3	(99.0;	99.6)	17186	85.3	(84.7;	85.8)	14615	100	(80.0;	100.0)	4446	90	(83.0;	97.0)
technique	Surgery	20	0.7	(0.0;	4.3)	819	4.1	(2.7;	5.4)	425	14	(1.0;	28.0)	46	2	(1.0;	2.0)