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

Paata Gvetadze a, Ivane Chkhaidze b, Solidea Baldas c, Rosanna Comoretto d,e, Dario Gregori d,* the Susy Safe Working Group 1

1 Department of the Respiratory Medicine, M.Iashvili Central Children Hospital, Averty Medical School, Tbilisi, Georgia
b M.Iashvili Central Children Hospital, Tbilisi State Medical University, Tbilisi, Georgia
c Prochild ONLUS, Trieste, Italy
d Unit of Epidemiology, Biostatistics and Public Health, Department of Cardiology, Thoracic and Vascular Sciences, University of Padova, Padova, Italy
e Internal Medicine Unit, Gemona del Friuli Hospital, Udine, Italy

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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.

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Abbreviations: FB, foreign bodies; U.S., United States; U.S.S.R., Union of Soviet Socialist Republics; CI, confidence interval.

* Corresponding author. Tel.: +39 049 8275384; fax: +39 02 700445089.
E-mail addresses: pataag@gmail.com (P. Gvetadze), ivane_ch@internet.ge (I. Chkhaidze), solidea.baldas@prochild.eu (S. Baldas), rosanna.comoretto@unipd.it (R. Comoretto), dario.gregori@unipd.it (D. Gregori).

1 The Susy Safe Working Group

Coordination Group
Prof. Dario Gregori, University of Padova, Italy. Principal Investigator
Dr. Solidea Baldas, Prochild Onlus, Italy
Dr. Paola Berchialla, University of Turin, Italy

Governing board:
Dr. Hugo Rodriguez, Hospital De Pediatria Juan P. Garrahan, Argentina
Dr. Paola Zaupa, Grosse schützen Kleine, Austria
Dr. Peter Spitzer, Grosse schützen Kleine, Austria
Dr. Costantinos Demetriades, Ministry of Commerce, Industry and Tourism, Cyprus
Prof. Ivo Slapasky, Masaryk University, Czech Republic
Prof. Lijilana Sokolova, Institute for Respiratory Diseases in Children, FVROM
Prof. Elefni Petridou, Athens University – Medical School – Department of Hygiene and Epidemiology, Greece
Prof. Manuel Antonio Caldeira Pais Clemente, Hospital S. Joao, Portugal
Prof. Jana Jakubikova, Children’s University Hospital, Slovack Republic
Prof. Sebastian Van As, Red Cross War Memorial Children’s Hospital, South Africa
Eng. Ton De Koning, Voedsel en Waren Autoriteit, The Netherlands
Prof. Sebastian Van As, Red Cross War Memorial Children’s Hospital, South Africa.

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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 injuries 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 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 disturbances, like inflammation [4]. Often, however, complications arise, sometimes 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 requirements 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.

Prof. Desiderio Passali, University of Siena, ItalyDr. Giselle Cuestas Hospital de Niños Ricardo Gutiérrez, ArgentinaDr. Sololde Baldas, Prochild ONUSS, Trieste, Italy.AlgerieDr. Nourredine Bouchikhi, Private Practitioner, Algeria, Argentina.Prof Alberto Chinsky, Children’s Hospital Gutiérrez, Argentina. Dr. Hugo Rodriguez, Children’s Hospital Juan P. Garrahan, Argentina. Dr. Susana Tortosa Hospital de Niños, Hospital de Oriente, Argentina. Dr. Graciela Sica, Hospital de Niños Ricardo Gutiérrez, Argentina. Dr. Giselle Cuestas Hospital de Niños Ricardo Gutiérrez, Argentina. Dr. Andrea Di Blasio, Hospital Interzonal de Junín, Argentina. Dr. Verónica Rodríguez, Hospital General de Niños Pedro de Elizalde, Argentina. Dr. Damian Taie, Private Practitioner, Argentina. Dr. Bibiana Paoli, Hospital de Clinicas José de San Martin, Argentina. Dr. Claudio Rene Marquez, Instituto superior de Otorrinolaringología, Argentina. Dr. Juan Razi, Hospital Italiano de Buenos Aires, Argentina. 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CameroonDr. Yves Nkodo, Private Practitioner, Cameroon.Clinical Jeffrey Ludemann, PC Children’s Hospital, CanadachildrenDr. Jiang Chenglong, Guping Provincial Maternity and Child Hospital, ChinaColombiaDr. Oscar Uriel Barón Puentes, Fundacion Neuromecanica Colombiana, ColombiaCroatiaDr. Ranko Mladina, University Hospital Salata, CroatiaDr. Eivians Gomez De La Rosa, Hospital Pediatrico Doente Elnino Nkono Miguel Matananas, CubaCyclingsDr. Olga Kalakouta, Medical and Public Health services, Ministry of Health, Cyprus. Dr. Andreas Melis, Areetaohe hospital, Cyprus. Florence Zezoun, Ammoschos General Hospital, CyprusCzech RepublicDr. Michaela Mächalová, Children’s University Hospital, Czech Republic. Dr. Jan Slapak Masaryk University, Faculty of Medicine, Czech Czech Republic. Dr. Pavla Peckova, Fakultn Thomayerova nemocnice, Czech Czech Republic. Denmark. Dr. Per Caye-Thomasen, Gentofte University Hospital, Denmark. Dr. Carlos Valdivia, Children Hospital Francisco de Icaza Bustamante, Ecuador. Dr. John Parker, Gilbert Hospital Pediatric, Ecuador. Dr. Enas Elsheikh, Suez Canal University, Egypt. Dr. Ahmed Ragab, Menoufiya University, Egypt. FinnlandDr. Anne Pitkäranta, Helsinki University Central Hospital, Finland. FranceDr. Philippe Contenin Necker, Enfants Malades Hospital, France. Dr. Jocelyne Derelle, CHU Nancy, France. Dr. Magali Wexler, SOS International Benoivmante National d’Etudes des Conduites A Risques, France. Dr. Martine Francois, Robert Debé Hospital, France. FranceDr. Stephane Pezzettogotta, Armand Trouseau Hospital, France. Dr. Christian Ruffato, Michallon, FrancePROMDr. Jane Buzarov, Institute for Respiratory Diseases in Children, PyromGyorgiDr. Iva Chikhaide, Iashvili Central Children Hospital, Georgia. GermanyDr. Roebich Bernhard, St. Joseph Hospital, Germany. Dr. Volker Jahnke, Charité Campus Virchow. Germany. Dr. Goktas Onder, Charité Campus Virchow. Germany. Dr. Petra Zierlack, Kinderheilkunde and Jugendmedizin, Naturverfahren und Akupunktur, Germany. Dr. Klaus Siegerfied, Charité Universitätsmedizin Berlin, Germany. Dr. Assen Koitschev, Klinikum Stuttgart Olghospital (OH). Germany. GreeceDr. Vicky Kalampokis, Athens University, Department of Hygiene and Epidemiology, Greece. Dr. Nikola Simasko, Democritus University School of Medicine, Greece. Dr. Charalampos Stamos, Municipal Hospital of Volos, Greece. Dr. Achal Gulati, Maulana Azad Medical College, Delhi, India. San Angelo Children’s Hospital. ItalyDr. Cesare Cutrone, University Hospital of Padova, Italy. Dr. Elisa Gaudini, Ear-Nose-Throat Department, Policlinico Le Scotte, Italy. Dr. Domenico Grasso, Burlo Garofolo Pediatric Institute, Italy. Dr. Nicola Mansi, Sanzontone Pausilupin Pediatric Hospital, Italy. Dr. Gianni Messi, Burlo Garofolo Pediatric Institute, Italy. Dr. Claudio Orlando, Sanzontone Pausilupin Pediatric Hospital, Italy. Dr. Sabino Preziosi, Elsorcorso ospedale Ravenna, Italy. Dr. Italo Sorrentini, G. Rummo Hospital, Italy. Dr. Marilena Trozzi, Bambino Gesu Pediatric Hospital, Italy. Dr. Alessandro Vigo, Sant’Anna Pediatric Hospital, Italy. Dr. Giuseppe Villari, G. Rummo Hospital, Italy. Dr. Giulo Casare Passali, Ear, Nose, and Throat Clinic, University “For Vergata”, Rome, Italy. Dr. Francesco Maria Passali, ENT Department, Catholic University “The Sacred Heart” of Rome, Italy. Dr. Renato Piantanida, Ospedale Manzoni, Italy. Dr. Carlo Giordano, Ospedale San Giovanni Battista Molinette, Italy. Dr. Leonardo Mercuri, Croce Rossa Italiana Foligno, Italy. Dr. Alessandro Cencon, CRI, Italy. Dr. Nicola Mansi, A.O.R.N. Sanzontone Pausilupin, Italy. Dr. Cesare Cutrone, Azienda di Padova-University Hospital of Padova, Italy. Dr. Giuseppe Villari, Azienda Ospedaliera G. Rummo, Italy. Dr. Matteo Giovan, Ospedale A. Manzoni-Lecce, ItalyJapanEng. Yoshifumi Nishida, National Institute of Advanced Industrial Science and Technology (AIST), Japan. Dr. Gainel Sutatayev, Kazakh National University of Public Health, KazakhstanKazakhstanDr. Ricardo Antonio De Hoyos Parra, Hospital Zambrano Helenium Tec Salud, Mexico. Dr. Jose Luis Treviño Gonzalez, Hospital Universitario de la Immunology, Mexico. Dr. Jose Eleuterio Garza, Mexico. University Hospital of Illinois, Chicago, USADr. Victoria Dr. José Eleuterio Garza, Mexico. University Hospital of Illinois, Chicago, USA. Dr. Janis Johnson, University Hospital, Nigeria. Dr. Muhammad Nazeer, University Hospital, Norway. Dr. Muhammad Taj Ali, University Hospital, Pakistan. Dr. Marios Peckova, University Hospital, Poland. Dr. Andrey Kom, Detskà Faktalà Nençònèka, Russia. Dr. Maksim Shvetski, Russian Republic. Dr. Oksana Serebriakova, Russia. Dr. Alexander Kuzubov, Russia. Dr. Roman Suvorov, Russia. Dr. Yuriy Drobchak, Russia. Dr. Vladimir Drobchak, Russia. Dr. Mikhail Zlotnik, Russian Republic. Dr. Gennadiy Serebriakova, Russian Republic. Dr. Yulia Ivanovna, Russian Republic. Dr. Andrey Kom, Detskà Faktalà Nençònèka, Russia. Dr. Maksim Shvetski, Russian Republic. Dr. Oksana Serebriakova, Russia. Dr. Alexander Kuzubov, Russia. Dr. Roman Suvorov, Russia. Dr. Yuriy Drobchak, Russia. Dr. Vladimir Drobchak, Russia. Dr. Mikhail Zlotnik, Russian Republic. Dr. Gennadiy Serebriakova, Russia. Dr. Alexander Kuzubov, Russia. Dr. Roman Suvorov, Russia. Dr. Yuriy Drobchak, Russia. Dr. Vladimir Drobchak, Russia. Dr. Mikhail Zlotnik, Russian Republic. Dr. Gennadiy Serebriakova, Russia. Dr. Alexander Kuzubov, Russia. Dr. Roman Suvorov, Russia. Dr. Yuriy Drobchak, Russia. Dr. Vladimir Drobchak, Russia. Dr. Mikhail Zlotnik, Russian Republic. Dr. Gennadiy Serebriakova, Russia. Dr. Alexander Kuzubov, Russia. Dr. Roman Suvorov, Russia. Dr. Yuriy Drobchak, Russia. Dr. Vladimir Drobchak, Russia. Dr. Mikhail Zlotnik, Russian Republic.
Table 1

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Susy Safe</th>
<th>Meta-analysis low income</th>
<th>Meta-analysis high income</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>95% CI</td>
<td>N</td>
</tr>
<tr>
<td>N</td>
<td>%</td>
<td>95% CI</td>
<td>N</td>
</tr>
<tr>
<td>0–3</td>
<td>1767</td>
<td>61.0 (58.7; 63.3)</td>
<td>10036</td>
</tr>
<tr>
<td>≥3</td>
<td>1129</td>
<td>39.0 (36.1; 41.8)</td>
<td>10118</td>
</tr>
</tbody>
</table>

Type of injury:
- Organic
  - Type
    - Removal
      - Endoscopy: N = 2876, 99.3% (99.0; 99.6) 17186, 85.3% (84.7; 85.8)
      - Surgery: N = 20, 0.7% (0.0; 4.3) 819, 4.1% (2.7; 5.4)

Type of injury:
- Inorganic
  - Type
    - Removal
      - Endoscopy: N = 405, 14.0% (10.6; 17.4) 14420, 71.5% (70.8; 72.3)
      - Surgery: N = 5, 0.2% (0.0; 0.9) 3706, 25.0% (19.0; 30.0)

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.

**Authors’ contribution**

Paata Gvetadze planned and conducted the study, collected data on patients, contributed in drafting the manuscript.

Ivane Chkaidze planned the study, contributed in drafting the manuscript.

Solidea Baldas contributed in drafting the manuscript and in critically revising it.

Rosanna Comoretto contributed to the statistical analysis and in drafting the manuscript.

Dario Gregori contributed in data analysis, manuscript drafting and in the overall supervision of the study.

**References**


