Original Article

DEMOGRAPHIC CHANGES IN THE POPULATION OF BULGARIA AS CHALLENGES FOR ANAESTHESIOLOGISTS

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Received: November 23, 2016
Revision received: December 13, 2016
Accepted: December 20, 2016

Summary

In the past two decades, the demographic crisis in Bulgaria has been widely debated. According to the National Statistical Institute (NSI), the proportion of people aged 65 and over is increasing, despite the general population decline in the country. To investigate whether the age structure of patients operated on has changed during the past 10 years and assess the need to reorganize the training of anesthetists, a retrospective study in the anesthesia electronic database of the University Hospital in Rouse was carried out. The data of anesthesia performed by anesthesiologists in 2005, 2010 and 2015 in patients aged 65 and over were summarized. The distribution of these patients by ASA Physical Classification System and frequency of complications during anesthesia were analyzed. The average annual number of anaesthesias for the three years was almost unchanged and amounted to about 5500. The proportion of patients aged 65 and over increased from 30.54% in 2005 to 35.72% in 2010, and 37.81% in 2015. The distribution of patients in according to the ASA Classification changed significantly: the percentage of patients ASA I-II dropped from 36.19% in 2005 to 11.85% in 2015. The patients in the ASA III-IV groups for the three analyzed years was 41.86%, 58.66% and 65.30%, respectively, and this was mainly due to the increase in the ASA IV patients. It is necessary to build multidisciplinary teams and prepare specialized protocols for behavior in geriatric patients. It is imperative that anesthesiologists possess specialized knowledge about age-related organ changes and their effects on anesthesia.
Key words: Geriatric anesthesiology, Bulgarian demographics, descriptive statistic

Introduction

The proportion of adults in Bulgaria increases and this increase leads to significant changes in population structure. In older patients, adverse effects and complications associated with anesthesia and surgery are more likely to occur for three main reasons: first, they have at least one but usually more than one co-morbidities, second, they have changed and impaired pharmacokinetics and pharmacodynamics, and third – they have reduced organ function [1].

The aim of this study was to identify the changes of the age structure of patients operated on in a

regional multi-profile hospital for 10 years and the need for reorganizing the education and training process of anaesthetists.

Materials and Methods

The electronic database of anaesthetic procedures performed in the University Hospital in Rouse was studied retrospectively. The database has been supported by anesthesiologists since 2003. At the end of 2016, it contained information about 70 000 anesthetic procedures performed on patients from the pediatric, purulent-septic surgery, vascular surgery, orthopedics and traumatology, urology, plastic and reconstructive surgery and the ENT departments. There was no information about anesthesia give in the obstetrics and gynaecology departments. The database concerned anesthesia performed by anesthesiologists and no data on local anesthesia given by operating room teams. The information of patients aged 65 and older, their distribution by ASA Classification and the overall incidence of complications was derived using proper filters.

Results

The information about the number and structure of the population in Bulgaria according to NSI data is summarized in Table 1 and Figure 1.

The data in Table 1 clearly show the trend of increase in the number of people aged 65 and over, despite the reduced number of overall population. Figure 1 shows the higher increase rate of the elderly among those aged 75-79.

Table 2 summarizes the total number of anesthesias and the proportion of patients 65 and older during the three years analyzed.

The significantly smaller number of operations/anesthesias in 2015 than in 2010 (p=0.025) can be attributed to changes in regulations introduced by the National Framework Agreement in 2015 and limited numbers of admissions. Another major factor was the opening of a new general hospital that attracted part of the patients.

It can be seen from Figure 2 that the number of the patients in the group 70-79 decreased, while that of patients in the other three age groups increased. The most significant increase in the number of patients aged 80-89 in 2005, 2010 and 2015 was – 219 (13.21%) 401 (19.14%) and 465 (25.56%), respectively.

Table 3 presents data on the distribution of patients according to ASA Classification. The figures clearly show that in both planned and emergency anesthesia the number of patients with clinically significant or life-threatening conditions had increased.

Table 4 presents data on the total number of complications registered in patients older than 60. Various types of complications are included, divided in to several groups: complications of respiratory system-oxygenation-gas exchange, the cardiovascular system, systemic reactions and systemic damage, injuries, lesions, blood, electrolyte balance, of the central and peripheral nervous system and neuromuscular transmission, technical defects, deficiencies, errors and specific complications associated with regional anesthesia.

Table 1. Prognosis of NSI for distribution of population by age, based on the results of the 2011 census

Year	**2011**	**2015**	**2020**	**2025**
	7 504 868	7 168 009	6 966 607	6 760 045
Age				
65-69	400 984	492 853	453 504	433 337
70-74	337 778	360 949	435 620	405 419
75-79	297 819	275 871	295 035	362 799
80-84	188 779	205 693	194 023	214 671
85-89	85 437	99 039	111 968	110 327
90-94	17 156	30 892	37 516	44 566
95-99	3 185	3 886	7 277	9 187
100+	233	166	283	441
Total		1 469 369/**20.50%**	1 635 226/**22.04%**	1 580 747/**23.38%**

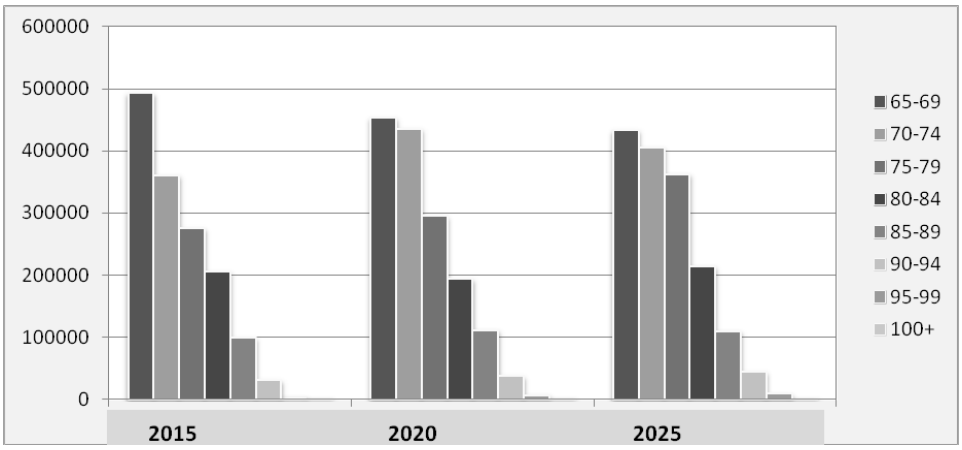

Figure 1. Distribution of people aged 65+ by NSI and prognosis of changes

Table 2. Total number of anesthesia conducted and proportion of patients aged ≥65

	2005	2010	2015
Anesthesia	5 428	5 865	5 221
Number of patients aged ⩾65	1 658	2 095	1 974
Percent of patients aged ⩾65 (%)	30.54	35.72	37.81

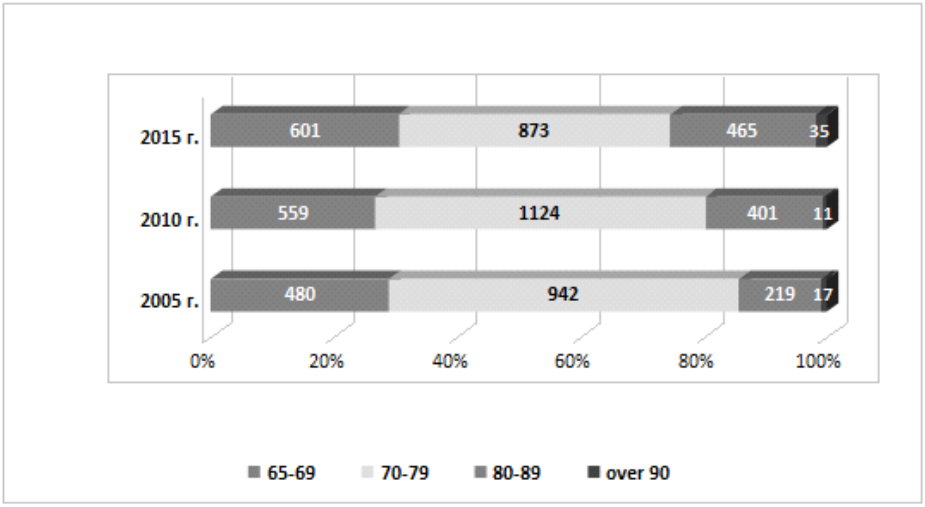

Figure 2. Distribution of patient subgroups by age (65-69, 70-79, 80-89, and 90+)

Table 3. Distribution of patients aged ⩾65 according to ASA Classification

	2005		2010		2015	
	Number	%	Number	%	Number	%
ASA I -II	600	36.19	330	15.75	234	11.85
ASA III-IV	694	41.86	1 229	58.66	1 289	65.30
ASA V	1	0.06	2	0.10	5	0.25
ASA IE*- IIE	116	7.00	89	4.25	53	2.69
ASA IIIE - IVE	232	13.99	417	19.90	368	18.64
ASA VE	15	0.90	28	1.34	25	1.27

*Emergency cases

Table 4. Complications registered during anesthesia

	Total registered complications	Complications in patients ⩾65
2005	938	422
2010	774	442
2015	631	368

Complication rates depend on many factors, including the accepted definitions [2], grades of severity – applied or not, mode of communication – anonymous or open, as well as what was reported. The department has adopted a European standard 5-grade scale to assess the severity of complications during anesthesia, in which 1 corresponds to no need for hospital stay to recover from anesthesia and additional monitoring, and V refers to lethal outcome. Complications were reported voluntarily and openly, regardless of degree of severity. Under such schemes for assessment and reporting, the normal frequency of complications, according to medical literature is 18-32%. On the other hand, if only complications that are potentially of legal importance are reported and recorded, the rate drops to values below 0.5%.

Table 4 shows that in 2010 and 2015 more than half of the complications registered occurred in patients aged ⩾ 65, and these patients were approximately one-third of the total number of patients. According to data from specialized publications, elderly patients have longer average hospital stay, higher costs for treatment, greater risk of developing complications in operations and higher hospital mortality [3].

Discussion

Over the last two decades, the demographic crises in Bulgaria became obvious. On the one hand, it can be attributed to ageing of the population and the increasing number of people over 65 years old. On the other hand, it is the result from the negative population growth and emigration. Although the number of patients over 65 years old in University Hospital Rouse decreased, their relative share increased from 30.54% in 2005 to 37.81% in 2015. The number of patients with ASA III and ASA IV and of complications during anesthesia also went up.

The challenges for anesthesiologists are determined by many factors – altered mental status and the risk of developing cognitive impairment and delirium, limited function of almost all systems – cardiovascular, respiratory, excretory, problems with thermoregulation, metabolic function, electrolyte balance, problems with permanent medication, and problems caused by surgical disease for which they are hospitalized.

Conclusions

The elderly need care provided by multidisciplinary teams including surgeons, anesthesiologists, therapists, physiotherapists, nutritionists and other medical specialists with expertise in the field of geriatrics. Designing specialized protocols for preoperative evaluation and preparation of patients, intraoperative management, and postoperative care and rehabilitation would be of great benefit for both health care providers and patients.

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