STUDY REGARDING THE AMOUNT OF ANESTHETICS AND MYORELAXANTS USED IN THE DEPARTMENTS OF ANESTHESIA AND INTENSIVE CARE UNITS

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Abstract

The rational administration and usage of medications is a major concern for specialists in the medical field. Analysing the amount of anaesthetics used in a county hospital represents the main objective of this study regarding the adequate usage of those medications by health care providers. This study was performed in the Emergency County Hospital of Oradea in 2014 and 2015, in the departments of Anesthesia and Intensive care units. Inhalational anesthestics were the most used among the anesthetic agents representing 46.95 % in 2014, respectively 50.89% in 2015, registering an increase of 9.47%. Opioids were the least administered agents (6.07 % in 2014 and 5.64 % in 2015) observing a decrease of 6.05% of their use. Muscle relaxants, representing less than 15% of the total consumption of anesthetic agents (14.90% in 2014 and 12.24% in 2015) registered the highest decrease in consumption (16.98%). Responsible administration of anesthetic agents in health care facilities can be achieved through collaboration between physicians and anesthesiologists and also by respecting the therapeutical protocols.

Key words: anesthetic agents, adimistration, costs, health care facilities.

INTRODUCTION

An important place in the hospital structure, generating high costs, is the Department of Anesthesia and Intensive Care (Broadway PJ, et al 1995). Nowadays, there is a huge tendency for improving medical services and increasing patient satisfaction, simultaneously saving and efficient allocation of resources (DeMonaco HJ, et al 1994, Macario A, et al 2003, Boldt J, et al 1998). Major component of health care are the last generation technologies and medications that inevitably increases health costs. In anesthesia, these new technologies are of great importance therefore it is essential to find a justification for these costs (Duncan CM, et al, 2009, Aldrete J., et al 1985). Available pharmacoeconomic methods are justified and can be applied for both anesthetics and muscle relaxants as well. Analyzing the consumption of anesthetics and muscle relaxants allows the anesthetist to prioritize the usage of those drugs which brings maximum

benefits while reducing costs (Jing Hu, et al 2015, Vitez TS. 1994, Bach A, et al 1997, Weiskopf RB, et al 1993).

This study attempts to highlight the amount of anesthetics and muscle relaxants consumed by the department of Anesthesia and Intensive Care Unit at the Emergency County Hospital Of Oradea through a comparative analysis between the years 2014 and 2015.

MATERIALS AND METHODS

A retrospective study was performed a period of two years starting from the 1st. Of January 2014 till the 31st. of December 2015 where the consumption of anaesthetics and muscle relaxants were analyzed in the two departments of Anaesthesia and Intensive Care Units, respectively AICU-I and II in the Emergency County Hospital of Oradea, including cost analysis both in the Intensive Care Units and operating theatres.

The analysis was performed by calculating the consumption of each group of anaesthetic agents and for each agent separately pro. Also, an average consumption of anaesthetic agents was calculated for each patient.

RESULTS AND DISCUSSION

A total number of 13031 patients were treated in the two departments in 2014 and 13753 patients in 2015. The distribution of patients in the departments during the last two years was as follows:

- In 2014: - 5331 patients were admitted to the Intensive Care Unit.
  - 7700 patients underwent anaesthesia, from which 70 were admitted in outpatient care.
- In 2015 : - 5.533 patients were admitted to the Intensive Care Unit.
  - 8.220 patients underwent anaesthesia, from which 93 were admitted in outpatient care.

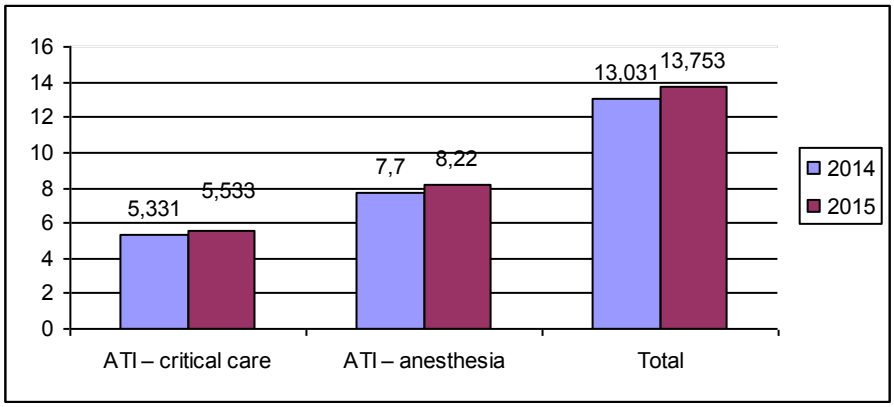

Fig. 1. Number of patients admitted

An increase of 5.54% can be observed in the number of patients receiving anesthetics in 2015 compared to 2014. An increase of 6.75% in the number of patients who underwent anesthesia and in the intensive therapy with 3.79%.

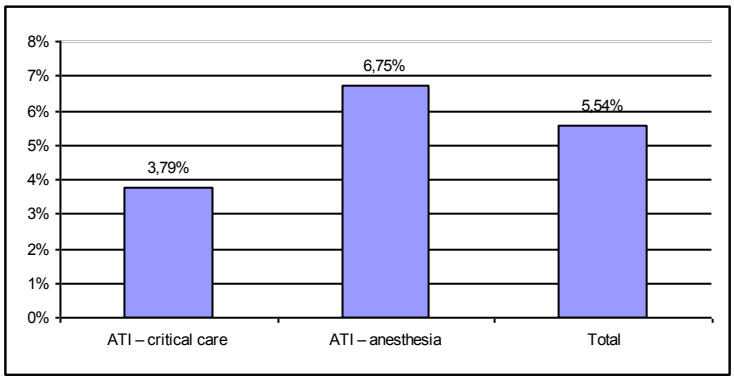

Fig. 2. Evolution of the number of patients to whom anesthetics were administered

Regarding the consumption of anesthetic agents and muscle relaxants, a general increase by 0.99% was observed in 2015 compared to the previous year, which means a cost of 563 750 to 569357lei. These increases appeared mainly due to increased consumption of inhaled anesthetics (9.47%) and local anesthetics (5.51%), although a decrease in the consumption of muscle relaxants (16.98%), opioids (6. 05%) and intravenous anesthetics (4.27%) were noted.

Table 1

Consumption of anesthetic substances according to the group

Type of anesthetic agent	**in 2014**		**in 2015**		**Evolution (%)**
	Sum(lei)	**Percentage(%)**	**Sum(lei)**	**Percentage(%)**	
Intravenous anesthetics	133.927	23,76	128.202	22.52	-4.27
Inhalational anesthetics	264.692	46.95	289.759	50.89	9.47
Local anesthetics	46.965	8.33	49.555	8.70	5.51
Opioids	34.195	6.07	32.127	5.64	-6.05
Muscle relaxants	83.971	14.90	69.714	12.24	-16.98
Total	**563.750**	**100.00**	**569.357**	**100.00**	**0.99**

The largest share of the total consumption was recorded for inhalation anesthetics (46.95% and 50.89%), followed by intravenous (23.76% and 22.52%) in both years 2014 and 2015, and the smallest is for the opioids (6.07% and 5.64%). Regarding the consumption according to groups of substances comparatively between the two departments, the data in Table 2

were obtained for the department of Anesthesia and Intensive Care Unit- I and table 3 for the the department of Anesthesia and Intensive Care Unit-II.

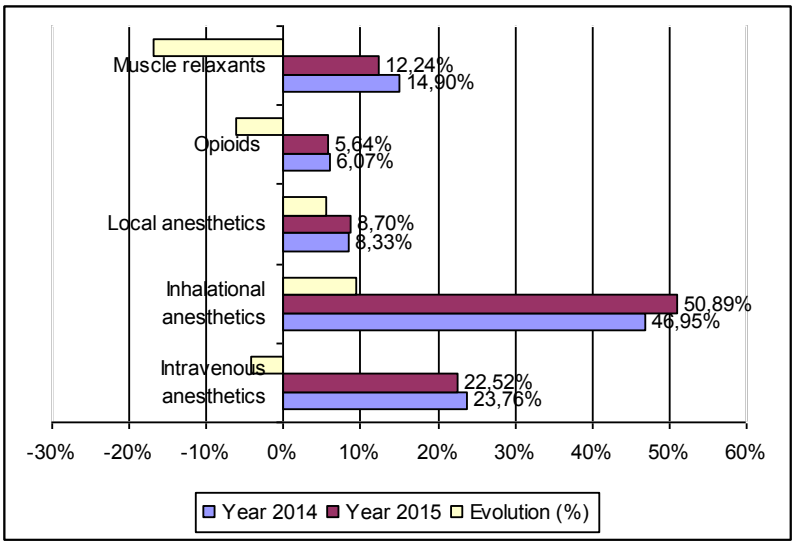

Fig.3. The percentage of each anasthetic group from the total consumption

Table 2.

Consumption of anesthetic substances according to the group- AICU-I

Type of anesthetic agents	**Year 2014**		**Year 2015**		**Evoluţion (%)**
	Sum (lei)	**Percentage(%)**	**Sum (lei)**	**Percentage(%)**	
Intravenous anesthetics	100.257	23.15	99.864	21.58	-0.39
Inhalational anesthetics	223.800	51.67	253.483	54.77	13.26
Local anesthetics	34.343	7.93	37.095	8.02	8.01
Opioids	17.177	3.97	18.665	4.03	8.66
Muscle relaxants	57.519	13.28	53.673	11.60	-6.69
Total	**433.096**	**100.00**	**462.780**	**100.00**	**6.85**

Table 3.

Consumul substanţelor anestezice în funcţie de grupă – AICU- II

Type of anesthetic agents	**Year 2014**		**Year 2015**		**Evolution (%)**
	Sum(lei)	**Percentag(%)**	**Sum(lei)**	**Percentage(%)**	
Intravenous anesthetics	33.670	25.77	28.338	26.59	-15.84
Inhalational anesthetics	40.892	31.30	36.276	34.04	-11.29
Local anesthetics	12.622	9.66	12.460	11.69	-1.28
Opioids	17.018	13.03	13.462	12.63	-20.90
Muscle relaxants	26.452	20.25	16.041	15.05	-39.36
Total	**130.654**	**100.00**	**106.577**	**100.00**	**-18.43**

In the department of AICU-I, the consumption of anesthetic substances increased by 6.85% in 2015 compared to 2014. The highest consumption registered was for the inhaled anesthetic substances with an increase of 13.26%.

In terms of consumption, intravenous anesthetics occupies the second place (23.15% and 21.58%), registering a minimal decrease of 0.39%.

The consumption of muscle relaxant was declining by 6.69%, having a percentage of 13.28% in 2014, respectively 11.60% in 2015.

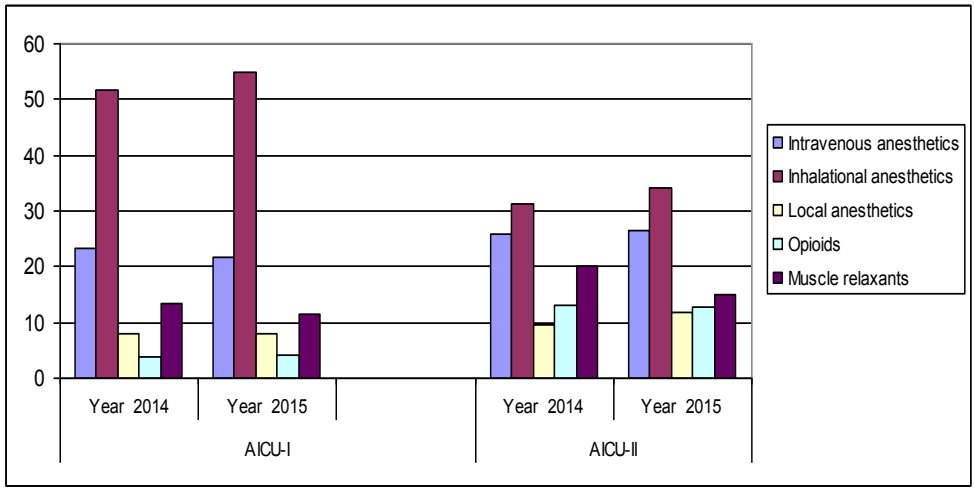

Fig. 4. The percentage of the anesthetic groups from the total amount of comsumption– AICU-I and AICU-II (Percentage)

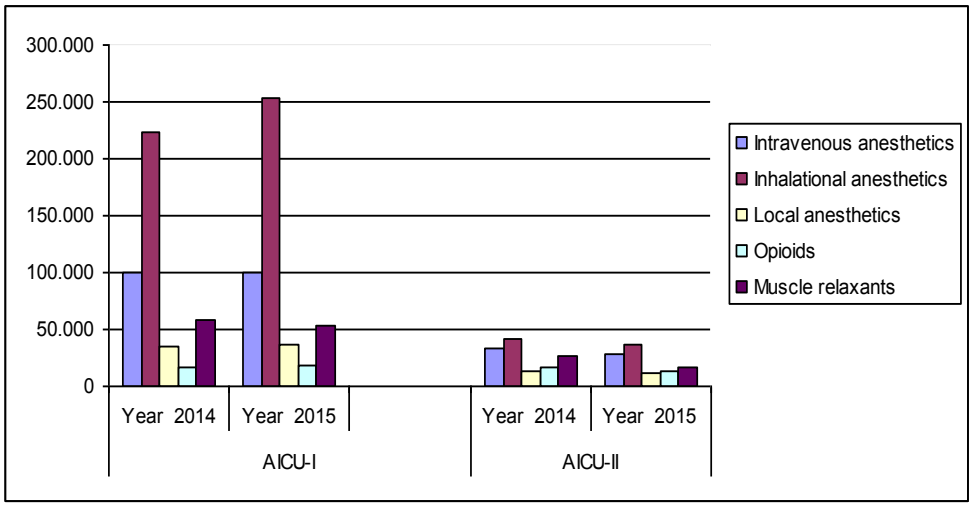

Fig. 5. The percentage of the anesthetic groups from the total amount of comsumption– AICU-I and AICU-II (Sum)

The consumption of anesthetic agents in the department of AICU-II was decreased in the year 2015 in comparison to 2014 by 18.43.

In the department of AICU-II, the highest consumption of anesthetics was recorded for the inhalational ones (31.30% and 34.04%), with a decrease of 11.29% in 2015 compared to 2014.

In the second place in terms of consumption comes the intravenous anesthetics (25.77% and 26.59%), the consumption decreased by 15.84% in 2015.

Muscle relaxants had a percentage of 20.25% of consumption in 2014, respectively 15.05% in 2015, the consumption showing a decrease of 39.36%.

Comapring between the 2 departments AICU-I and II, we notice that more than half of the consumption of anesthetics in the department of AICU-I are from the inhalational agents (51.67% in 2014 and 54.77% in 2015), while in the department of AICU-II, that percentage was less than 35% (31.30% in 2014 and 34.04% in 2015).

Regarding changes in the consumption of anesthetics in the two departments, in the department of AICU-I, it was observed an increase of 6.85% in general consumption, compared to the other department AICU-II, where a decrease of 18.43% was noticed.

In the department of AICU-I, it was observed an increase of 13.26% in the consumption of inhalational anesthetics to 8.01% for the local ones, and of 8.66% for the opioids,while the consumption of the intravenous agents remained approximatively the same, but a decrease of 6.69% was noticed in the consumption of muscle relaxants.

In the department of AICU-I, consumption decreased in all groups of anesthetics, the largest being for opioids (39.36%) and lowest for local anesthetics (-1.28%).

In references of Anesthesia and Intensive care and from daily practice total costs of anesthesia include both direct costs (medications used during anesthesia itself) and indirect costs (medications used to alleviate the adverse effects which may occur due to anesthetic agents adminstration).

A precise calculation of the costs of the anesthetic drugs and muscle relaxants used, is particularly important for intravenose anesthesia, opioids and muscle relaxants that due administration per kg body weight and packaging with certain grammage, may record losses, not being consumed all the available quantity in the packaging.

By paying particular attention to the use of these substances, costs can be reduced, which will contribute to the rational use of anesthetic drugs.

CONCLUSIONS

The highest consumption of anaesthetic substances in the departments of Anaesthesia and Intensive Care Units was 46.95% for inhalational anaesthetics in 2014, respectively 50.89% in 2015, with an increase of 9.47%. The lowest consumption was registered among opioids (6.07% and 5.64%), with a decrease of 6.05%. Muscle relaxants, representing less than 15% of total consumption of anaesthetics (14.90% and 12.24%) registered the highest reduction in consumption (16.98%).

Comparing the two departments AICU-I and II, it was noticed that more than half the consumption of anaesthetics in the department AICU-I were from the inhalational anaesthetics ((51.67% in 2014 and 54.77% in 2015), while in the department of AICU-II, this percentage is less the 35% (31.30% in 2014 and 34.04% in 2015).

Regarding the consumption trends for anaesthetics agents in the two departments included in the study, an increase of 6.85% was observed in the department of AICU-I in comparison to the department of AICU-II, where a decrease of 18.43% was noticed.

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