Pharmacoeconomic analysis of xenon anesthesia in neurosurgery

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Abstract

Cost analysis of xenon anesthesia with a closed circuit system in neurosurgery shows that it's cost acceptable for long lasting anesthesias.

Background

Xenon has many characteristics of an ideal anesthetic in neuroa-nesthesiology. But with a high cost (6,8 euro/l) the question is whether it is cost acceptable. We analyzed the cost of xenon closed circuit anesthesia of different duration and compared it to the cost of TIVA with propofol.

Figure 1. Xenon has many characteristics of an ideal anesthetic in neuroanesthesiology. It assures stable MAP and thus stable CPP.

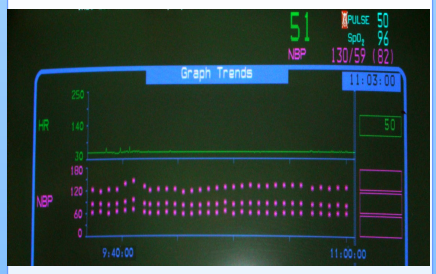


Figure 3. GKM-03 gas analyzer (Insovt, Russia)

Methods

51 anesthesias were carried with closed-circuit Axeoma™ machine (Alfa-Impex Oy, Finland), designed for xenon use. Xenon concentration in the circuit were obtained with GKM-03 gas analyzer (Insovt, Russia), and xenon expenditure with DKM-02 batcher (KseMed, Russia). We divided all cases into 6 groups by duration: less than 2 hr, 2 to 3 hr, 3 to 4 hr, 4 to 5 hr, 5 to 6 hr and 6 to 7 hr. We calculated xenon expenditure per hr, per anesthesia, and cost of anesthesia (table 1). The cost of TIVA anesthesia with propofol in our institution is 12, 8 / hr (95% CI 8,57 17, 14). We compared it to the cost of xenon anesthesia (see the chart).

Figure 2. **Axeoma™** closed-circuit xenon anesthesia machine (Alfa-Impex Oy, Finland).

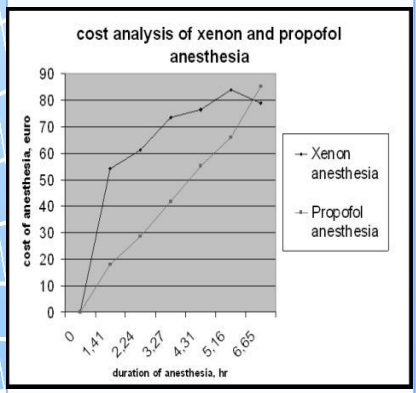
Results chart

Xenon expenditure and cost of anesthesia depending on its duration

Duration, hr	<2	2-3	3-4	4-5	5-6	6-7
Number of cases	8	10	8	10	11	4
Mean duration, hr	1, 41 ±0,16	2,24 ±0,18	3,27 ±0,30	4,31 ±0,24	5,16 ±0,28	6,65 ±0,47
Xenon expenditure per anesthesia, l	7,96 ±1,93	8,99 ±3,26	10,80 ±1,52	11,23 ±1,87	12,33 ±2,08	11,62 ±0,74
Xenon expenditure, l/hr	5,61 ±1,21	4,02 ±1,57	3,40 ±0,84	2,30 ±0,28	2,83 ±1,04	1,72 ±0,30
Cost of anesthesia, euro	54,12 ±12,92	61,13 ±22,16	73,44 ±10,33	76,36 ±12,71	83,84 ±14,14	79,01 ± 5,03

Results

Our data confirmed a correlation between cost and duration of xenon anesthesia: longer is anesthesia, less is the cost of anesthesia per hour. The maximal expenditure corresponds to the circuit filling (the first hour of anesthesia), then remains stable and low. Hence, for a 6-hour anesthesia the cost of xenon is comparable to that of propofol, and for longer anesthesia it becomes lower.



Conclusion

In a closed circuit system, the cost of xenon anesthesia per hour diminishes with time. If longer than 6 hours its cost is lower than that of TIVA. Xenon anesthesia is cost acceptable in neurosurgery.

References

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