COST-EFFECTIVENESS EVALUATION OF PHACOEMULSIFICATION PLATFORMS IN THE RUSSIAN FEDERATION

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BACKGROUND

Health technology assessment (HTA) of medical devices remains emerging direction. As a part of HTA we provide cost-effectiveness analysis of different phacoemulsification platforms, available in Russia.

OBJECTIVE

TO EVALUATE PHACOEMULSIFICATION PLATFORMS BASED ON COST-EFFECTIVENESS APPROACH IN THE RUSSIAN FEDERATION.

CENTURION

INFINITI

STELLARIS

STELLARIS PC

WHITESTAR SIGNATURE

VISALIS 500

METHODS

We tested cost-effectiveness approach for evaluation of four phacoemulsification platforms: Centurion© by Alcon Inc., Stellaris© and Stellaris PC© (StPC) by Bausch&Lomb and Visalis 500© (Vis500) by Zeiss. Usually cost-effectiveness evaluation assumes use of effectiveness criteria, that is relevant to patient's outcome. Therefore, we determined effectiveness criteria as cumulative dissipated energy (CDE, seconds) during operation for each of platforms, as CDE is associated with patient's safety. The data on effectiveness of the platforms were obtained from expert assessment. The reason for using these effectiveness criteria and data source was the lack of data of relevant to cost-effectiveness evaluation comparable data in clinical trials for each of platforms. At the beginning of the September 2019 we received results of extension of our study, where we provide additional assessment of average ultrasound time and average aspirated volume for each of platforms. As we have made cost-effectiveness evaluation for phacoemulsification platforms, we considered only direct costs for them. The source of the costs was public data of government procurement average prices for the period of 2016-2018 years Exchange rate was €1 = 72 Rub.

RESULTS&DISCUSSION

Expert assessment, provided by the head doctor of the largest ophthalmic center in the Russian Federation (S.N. FEDOROV NMRC "MNTK "EYE MICROSURGERY"), have shown, that CDE was 3, 10, 10 and 20 for Centurion©, Stellaris©, StPC and Vis500, respectively. Centurion© demonstrated the lowest value of CDE. Additional assessment for average ultrasound time and average aspirated volume (for mild and moderate cataract) was provided by expert panel of 18 experts. Results are presented in fig. 1A and 1B. The smallest value of parameters such as ultrasound time and the volume of aspirated fluid during medium-density cataract surgery on the Centurion© platform may indicate its safer profile.

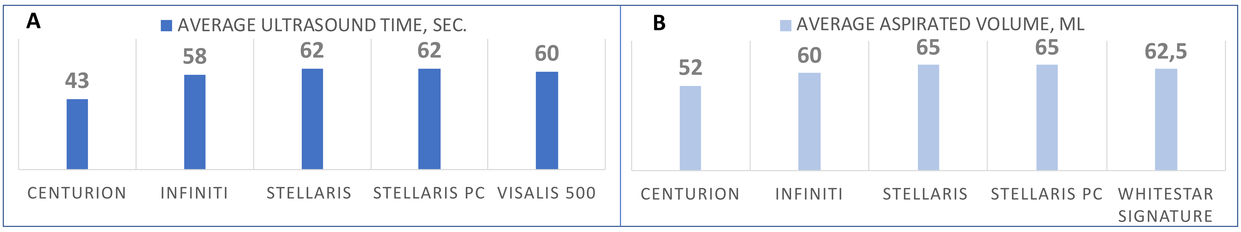

FIGURE 1. RESULTS OF EXPERT ASSESSMENT FOR AVERAGE ULTRASOUND (A) AND AVERAGE ASPIRATED VOLUME (B) FOR EACH OF PLATFORMS

Platform's costs were €73 311, €43 426, €75 074 and €61 478 for Centurion©, Stellaris©, StPC and Vis500, respectively. ICERs for Centurion were €4 263, €250 and €694 compare to Stellaris©, StPC and Vis500, respectively. Calculated ICERs for Centurion© demonstrates relatively small incremental costs for its advantages in CDE, reduction of average ultrasound time and average aspirated volume compare to same generation platform StPC© and Vis500 (see table 1).

	ICER (Centurion© compare to comparators)		
	CDE reduction (units)	**Reduction of average ultrasound time (sec.)**	**Reduction of average aspirated volume (ml)**
Infiniti©	n/a	€2583	4861
Stellaris©	€4263	€1569	2292
Stellaris PC©	€250	€92	135
Visalis 500©	€694	€694	n/a

TABLE 1. CALCULATED ICERS

We were forced to use expert assessment of surrogate endpoints due to available evidence base (trials) for phacoemulsification platforms does not meet needs of HTA. Experts preferred to use as effectiveness criteria % of endothelial cell loss, unfortunately, such assessment point used in a few of trials, moreover high grade of heterogeneity in trial design (clinical/laboratory(type of eye model in laboratory study)/number of surgeons/number of patients/types of endpoints) demands to apply very sensitive assumptions to provide comparative effectiveness research. We hope that increasing need in robust HTA for medical devices will improve relevant evidence base of efficacy and safety of phacoemulsification platforms.

CONSLUSION

We performed quantitative cost-effectiveness evaluation for phacoemulsification platform, nevertheless more relevant effectiveness criteria is still required to become more robust evidence in decision-making. The results of incremental cost-effectiveness analysis showed that the additional cost of the additional advantage of the Centurion© platform in terms of ultrasound time and the volume of aspirated fluid in comparison with other platforms characterizes the Centurion© platform likely to be more efficient.

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