

Initial Experience with Bulgarian Arthroplasty Register

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Abstract

Introduction: National arthroplasty registries date back to 1975, when the Swedish Knee Arthroplasty Register was founded. This method of database collecting has since been employed for both patient follow-up and the creation of annual statistical reports. In Bulgaria, there is currently no state-approved software that offers these features.

Aim: The current study aimed to report on the preliminary findings from our use of the OrthoWave software and the launch of the first Bulgarian registry for arthroplasty.

Materials and methods: Using the OrthoWave program, we gathered data on 215 patients who underwent 218 surgical procedures for hip and knee replacement in the Orthopedics and Traumatology Clinic at Tsaritsa Joanna University Hospital, ISUL, between November 2022 and August 2023. Both demographic indicators (sex, age, and BMI) and characteristics of the surgical procedure (intervention execution time, approach used, type and size of prosthesis) were gathered and analyzed.

Results: All subjects had a mean BMI of 29.3 kg/m², calculated using OrthoWave's statistical analysis system. The average weight during surgery was 93 kg, with an average height of 176 cm. The mean age of patients at the time of surgery was 66.11 years. Sex distribution of patients with hip replacement was as follows: 61.38% of them were men and 32.62% were women. Women accounted for 58.9% of all patients with knee endoprostheses, while operated men accounted for 41.1%.

Conclusion: In the era of evidence-based medicine, the form of register is crucial for further development of the orthopedic specialty. Our initial experience is promising, and we are looking forward to its development on a national level.

Keywords

arthroplasty register, hip replacement, knee replacement, OrthoWave

INTRODUCTION

National and regional arthroplasty registries have been growing and expanding since the Swedish Knee Arthroplasty Register was established in 1975. Shortly after, this practice was adopted by other Scandinavian countries, and

today, many countries with developed healthcare systems use registry platforms for gathering and processing information related to the surgical replacement of major joints.^[1]

The data processing from such systems enables surgeons worldwide to identify poorly performing implants and unsuccessful surgical techniques, thereby enhancing their

level of competence by selecting the most suitable products and proper surgical procedures for their patients. Furthermore, similar software provides options for follow-up patients with joint replacements and facilitates data processing for annual reports associated with this intervention.^[2]

At present, there is no state-approved software in Bulgaria that allows surgeons practicing within our country to input their patients' data. The only electronic database recording the number of implanted endoprosthesis is related to medical products within the Bulgarian Drug Agency. The information provided by such sources is quantitative only, that is, they just record the number of implanted devices. It is impossible to draw statistical conclusions or analyze accomplished results based on so small amounts of data. The existence of an arthroplasty registry is crucial, not only for ensuring optimal healthcare but also for the optimization of the expenses related to the treatment and rehabilitation of patients undergoing joint replacement surgeries.

AIM

The purpose of this study was to present the initial experience of the Orthopedics and Traumatology Clinic at Tsaritsa Joanna University Hospital, ISUL, using the OrthoWave™ system.

MATERIALS AND METHODS

In November 2022, the first form of an arthroplasty register in Bulgaria was initiated. The OrthoWave application was used for this purpose, providing access to 6 centers in Bulgaria.^[3] Participation in the register was entirely voluntary, and the software was provided free of charge to all 6 centers. The presented materials are from the Orthopedics and Traumatology Clinic at Tsaritsa Joanna University Hospital, ISUL. From November 1, 2022, to August 31, 2023, 215

patients with 218 knee and hip prostheses were added to the register (145 hip replacements, 73 knee replacements). The demographic indicators of sex, age, and BMI, and characteristics of the surgical procedure such as intervention execution time, approach used, type and size of prostheses, were gathered and analyzed.

RESULTS

The sex distribution differed between the two cohorts, with men accounting for 61.38% and women for 38.62% of hip endoprosthesis surgeries. Among patients with knee endoprotheses, women were predominant accounting for 58.9%, whereas operated men were 41.1%. The mean BMI of all operated individuals was 29.3 kg/m². The average weight during surgery was 93 kg, with an average height of 176 cm. The mean age of patients at the time of surgery was 66.11 years (**Fig. 1**).

In terms of total operation time, the average was 38 minutes for treatments involving the hip joints and 49 minutes for surgeries involving the knee joints. An analysis of the implants used in patients with hip endoprotheses showed the following results: the most commonly used acetabular component was 52 mm, and the most frequently utilized stem was size 12. A head size of 36 mm was used in more than 50% of the cases. Cementless fixation of the components was used in 72% of the cases and a Dual-Mobility cup appeared in 7%. In 114 hip surgeries, the lateral-transgluteal approach was used, 29 were performed using the Rottinger approach, and two hip prostheses were implanted using the Kocher-Langenbeck approach. All knee joint replacements were performed using the medial parapatellar approach. A cruciate retaining prosthesis was used in 37% of the patients while a posterior-stabilized artificial joint appeared in the rest of the cases (**Figs 2,3**).

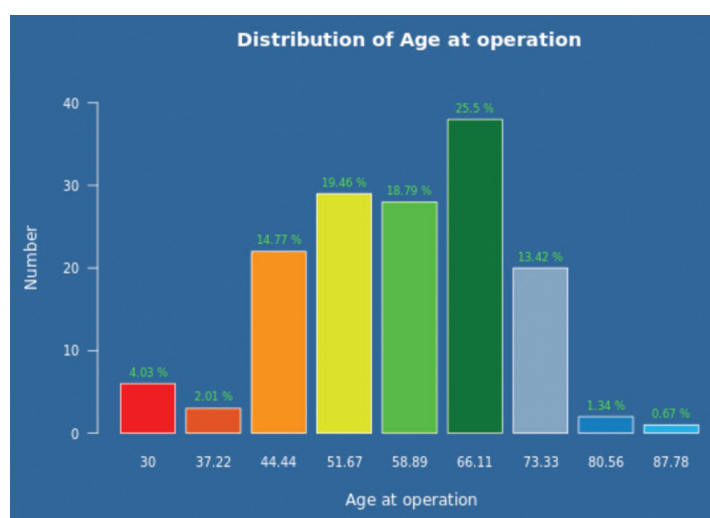


Figure 1. Distribution of age at operation.

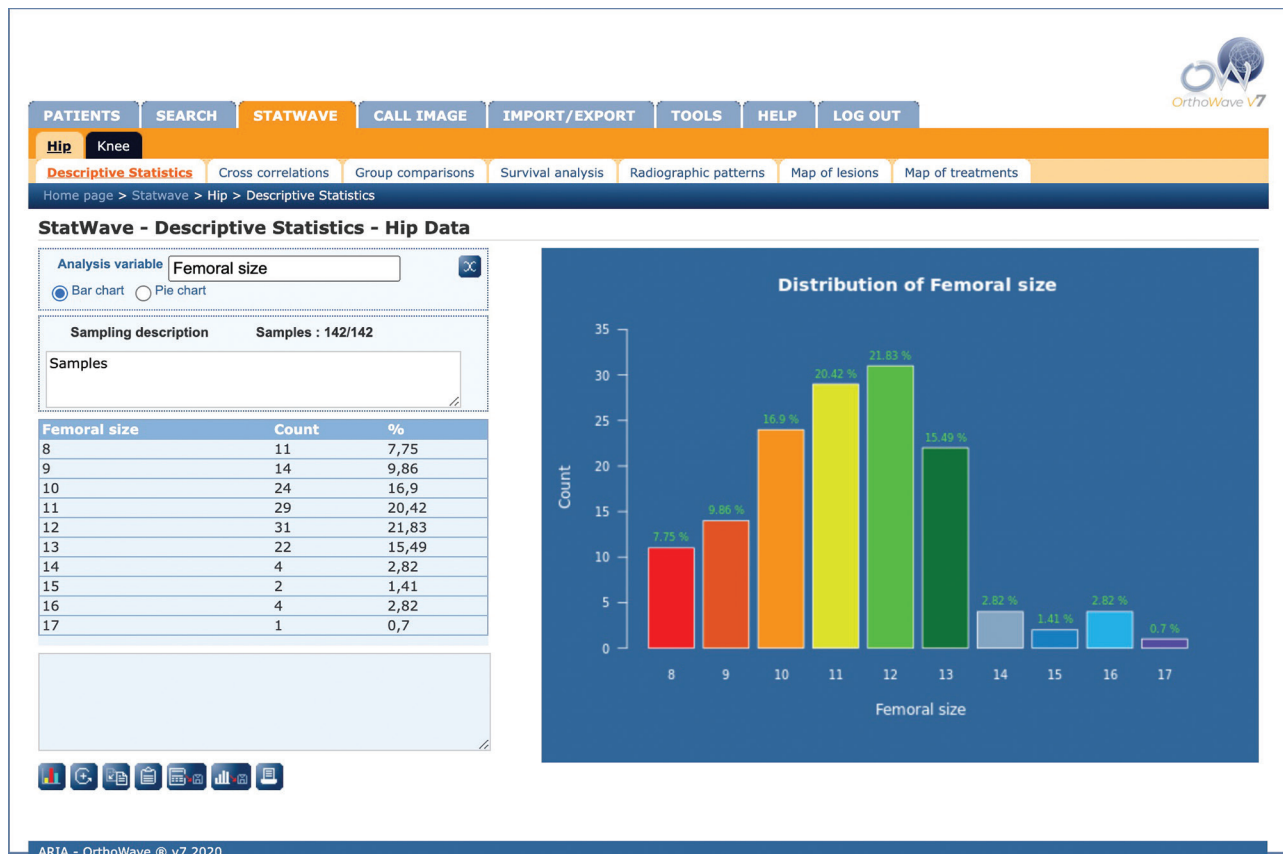


Figure 2. Distribution of femoral size.

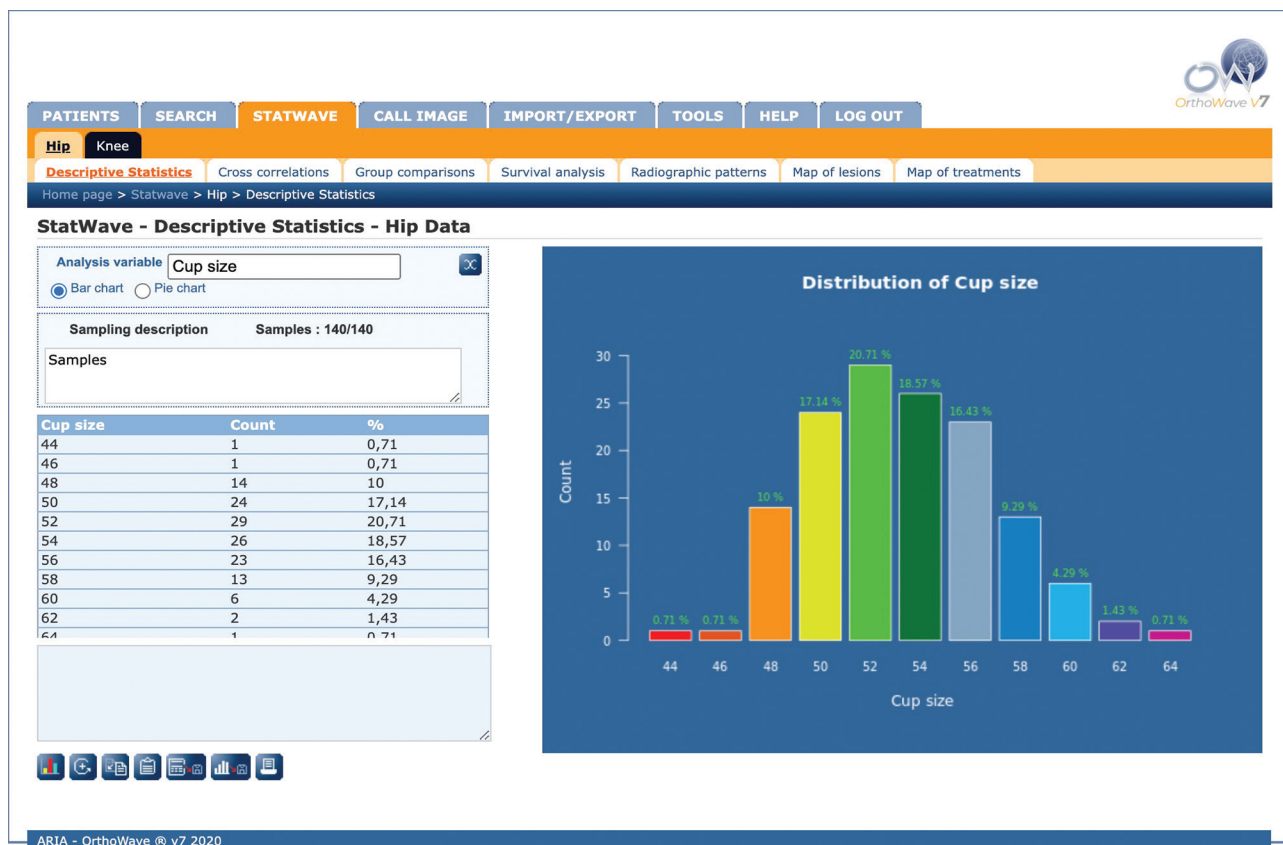


Figure 3. Distribution of cup size.

DISCUSSION

Traditionally, the value of clinical information is determined by its place in the hierarchy of clinical evidence. The basis of this hierarchy is to establish causal connections concerning the demonstrated results. Different designs of clinical trials provide varying degrees of reliability of information, with randomized control clinical trials being accepted as having the highest level of reliability.^[4] In this aspect, the format of a practice registry represents an observational study encompassing a vast cohort of participants. To make such a database indicative, participation of the greatest number of hospitals, surgeons, patients, operative techniques, and implants is of great importance.^[5] Our initial experience is related to the work of 6 centers and an insufficient number of surgeons, which we acknowledge as a primary weakness of the present study. Popularizing the Bulgarian Arthroplasty Register should be a priority for the organizations of Bulgarian orthopedists within the country.

The impact of the registries on orthopedic practice has been obvious since the creation of the Swedish registry. The first large, long-term study based on registry data demonstrated the significance of cementing techniques and proper implant selection. Furthermore, the inclusion of hemiarthroplasties in the database in 2005 contributed to favoring the lateral approach for this procedure, significantly reducing the risk of dislocation.^[6]

The results reported by patients form the basis of follow-ups and reflect the relationship between a given intervention and the change in quality of life after its performance. Two main types of scores for assessment are prevalent in ISAR studies (International Society of Arthroplasty Registries). They are generic (reflecting overall health) and specific (focused on specific symptoms, diseases, and functions).^[7] Comparing these methods for assessing the condition before and after the intervention demonstrates patient satisfaction and serves as a solid argument for the operation choice of a surgeon. Our software allows validation of such scores both preoperatively and during the follow-up period.

Despite the undeniable advantages of having a national arthroplasty register, there are many difficulties associated with both its management and funding. In most cases, national registries are maintained by the national orthopedic associations of a given country. In other cases, the government manages the registries or works closely with federal health authorities. Both models seem to have shown successful results, but a message from Kolling and colleagues evidently emphasizes the importance of cooperation among individual structures.^[8]

CONCLUSIONS

The presented study reflects the immense significance and immediate benefits of an arthroplasty registry for both the

orthopedic community and patients undergoing endoprosthetic treatment. Our initial experience with the OrthoWave software demonstrated that it is optimized for everyday practice and enables comprehensive statistical analysis of the entered data. Its development on a national level is still ahead of us.

Author contributions

A.P. drafted the manuscript, G.L. and G.L. performed the statistical analysis, and S.D., S.I., and P.K. edited the final draft.

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Competing Interests

The authors have declared that no competing interests exist.

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Первоначальный опыт работы с Болгарским регистром артропластики

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Резюме

Введение: Национальные реестры артропластики ведут свою историю с 1975 года, когда был основан Шведский регистр артропластики коленного сустава. С тех пор этот метод сбора базы данных использовался как для наблюдения за пациентами, так и для создания ежегодных статистических отчетов. В Болгарии в настоящее время нет одобренного государством программного обеспечения, предлагающего эти функции.

Цель: Настоящее исследование направлено на то, чтобы сообщить о предварительных результатах использования нами программного обеспечения OrthoWave и запуске первого болгарского реестра артропластики.

Материалы и методы: С помощью программы OrthoWave мы собрали данные о 215 пациентах, перенёсших 218 хирургических операций по замене тазобедренного и коленного сустава в Клинике ортопедии и травматологии Университетской больницы „Царица Йоанна“, ИСУЛ, в период с ноября 2022 по август 2023 года. Оба демографических показателя (пол, возраст и ИМТ) и характеристики хирургической процедуры (время выполнения вмешательства, используемый доступ, тип и размер протеза) были собраны и проанализированы.

Результаты: У всех испытуемых средний ИМТ составлял 29.3 kg/m², рассчитанный с использованием системы статистического анализа OrthoWave. Средний вес во время операции составил 93 кг, средний рост 176 см. Средний возраст пациентов на момент операции составил 66.11 лет. Распределение пациентов с эндопротезированием тазобедренного сустава по полу было следующим: 61.38 % из них составляли мужчины и 32.62 % – женщины. Женщины составили 58.9 % всех пациентов с эндопротезами коленного сустава, тогда как прооперированные мужчины составили 41.1 %.

Заключение: В эпоху доказательной медицины форма регистра имеет решающее значение для дальнейшего развития ортопедической специальности. Наш первоначальный опыт является многообещающим, и мы с нетерпением ожидаем его развития на национальном уровне.

Ключевые слова

регистр для артропластики, замена тазобедренного сустава, замена коленного сустава, OrthoWave