PERSPECTIVE ARTICLE

National Joint Registry of Iran

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Abstract

Joint replacement is currently on the rise with a high community burden. A registry was designed to evaluate the costs, possible complications, and rate of revisions as well as finding the most effective techniques, risk factors associated with poor results, indications for revision surgeries, and also demographic evaluation of patients undergoing joint replacement surgery in Iran.

Level of evidence: V

Keywords: Arthroplasty, Hip, Knee, Registry, Total joint replacement

Introduction

Knee and hip arthroplasty are common surgical procedures which has been much improved recently and their safety and efficacy in improving the joints function and quality of life as well as relieving pain have been discussed in different studies (1-3). However, in recent decades there has been a steady rise in the rate of total joint arthroplasty (TJA) not only in elder patients but also in young adults. Every year, over 60,000 total knee and hip replacement surgeries are performed in the USA costing over $65 billion. The volume of these surgeries will be increased to over four million in the next decade (4, 5). Different factors such as increasing number of TJA in more active and young adults as well as implant longevity result in more and more revision surgeries (6, 7). National estimates of the USA has shown that for every 1% reduction in the annual number of revision surgeries, the economic burden on the health-care system will decrease $42.5-112.6 million (5). TJA Registries can help elucidate the exact number of primary and revision TJAs, evaluate the economic burden on health care system, make decisions in choosing better implants, and analyze the outcomes, complications, and the risk factors for poor outcomes (8, 9). There are four levels of data collection for TJA registries. The first level includes the patient, surgeon, and hospital names as well as the date and type (primary or revision) of the surgery; The second level includes factors that may affect the outcomes of the surgery such as surgical complications and patients' comorbidities and risk factors; In the third level, patients can complete a questionnaire about their postoperative quality of life, satisfaction, function, and level of activity; and the final level of TJA registries included pre- and postoperative radiological features indicating implant failure. Unfortunately, in our country, all the information about TJA outcomes and complications and the indications of revision surgeries come from single center or single surgeon-based articles. This study has aimed to establish national joint registry to determine the rates of TJA revisions and complications; find out the most effective techniques and implants for TJA; define the risk factors associated with poor results; identify the indications for revision surgery; and evaluate the demographic data of patients undergoing surgery in our country.

Materials and Methods

Initially, only the first level of the registry including patients' demographic information, surgeons' and hospitals' information, the cause of joint disease, the type of surgery (primary or revision) and the characteristics

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of prostheses was started to facilitate the implementation of the software at a widespread level throughout the country. Simultaneous recording of all four levels of the registry will not only lead to a lot of implementation problems, but also may arise many disagreements by surgeons, hospitals and prosthesis providers due to time-consumption and fear of consequences. The possible recording of surgical procedures in the registry system failed to execute the plan.

The benefits of implementing the registry in four level is to facilitate the implementation of the project by hospitals, doctors, and medical equipment companies, as, one of the most fundamental problems facing all joint replacement registries around the world is the low level of compliance of surgeons and prosthesis providers participating in the project under various excuses and with the intention of refraining from clarifying the complications of the surgical procedures performed by them.

To perform data entry in our registry as the first example of a company based TJA registry, various strategies were put forward to guarantee the accurate and complete entry of patients' information. This information is provided by the representatives of the supplying companies in the operating room who have access to the registry software. The representatives signed up in the software and their activity was monitored in two levels. Firstly, the surgeon needs to confirm the accuracy of the information entered by the agent. In the second step, the pharmacy representative uses a tracking code to double check the recorded information with the invoice information submitted by the company representative. Apparently, in case of any mismatch at any of the two levels, the price for prosthesis will not be paid to the company and the patient will not be discharged.

Implementation of registry plans across the world is carried out by specialized committees as non-governmental organizations (NGO) consisting of representatives of the community of orthopedic surgeons, Ministry of Health, and various medical equipment companies. However, implementation of the registry project in our country by an NGO is virtually impossible, as, the implementation of an optimal project requires precise and obligatory supervision of the Ministry of Health and Medical Education. The registry designer concerns are not only the full implementation but also the accuracy of the information entered by the users.

Results

Assigning a unique registration number to each patient was necessary to ensure the uniformity of patient information entry throughout the country. Hence, the national code was used as the registry No. If the patient has previously undergone joint replacement surgery anywhere throughout the country, their name would automatically appears on the system using the national code, otherwise, the user would need to enter the patient's particulars.

In the next step, the date and location of surgery (province, city, and hospital) as well as the medical system registration number of the orthopedic surgeon responsible for the surgery would be recorded. Type (primary, revision, conversion according to the ICD9 criteria) and side (right or left) of the surgery were recorded next.

As recording all the details of the prostheses was not possible due to their diversity in the market, the food and drug administration unit in the Ministry of Health has recently started to assign a unique code to each imported medical product (called IRC). No company has the permission to sell any prosthesis in the country without the IRC code. However, before the project was fully implemented by the Ministry of Health, we decided to use the "REF NO.", which indicates the size and type of the prosthesis, and the "LOT NO.", which indicates the series of manufacturing. Barcode scanners are used in many advanced centers of the world to enter prosthesis data. However, providing barcode readers in the first stage of implementation for hospitals throughout the country was difficult and happened to be another excuse to prevent users from registering information. The project designers concluded to get REF No data from the companies and pre-register them in the system. Subsequently, if this type of prosthesis was registered in the system, the full details of the prosthesis would be displayed on the system, otherwise, the user would proceed with modification of the information or a new REF NO system would be registered in the system for future use. In the end, "final registration" would confirm patient's information in the system and the tracking code would be provided to the user. This code was recorded on the patient's surgical record sheet and subsequently controlled by the hospital pharmacy to match the equipment invoice provided by the company with the type of prosthesis registered in the system.

Discussion

National registry programs for joint replacement surgery are able to collect information on all major surgeries in the country, in collaboration with the orthopedic association of the country and funding from the Ministry of Health (10). This will not only reduce revision surgeries, but also will reduce the burden of joint replacement. The first joint registry that included knee replacement surgery was designed in Sweden in 1975. Four years later, the first national hip replacement registry was launched in Sweden. These registries are considered to be the first registry systems around the world and are run under the supervision of the Swedish Ministry of Health. Since 1989, SKL's non-governmental organization and Western Gota land have been actively involved in the project (11). In 1987, for the first time in Norway, a registry system for hip replacement surgery was launched. This registry was later extended to all surgical procedures including knee replacement, elbow, shoulder, and wrist in 1994. The idea of designing this project was formed considering the fact that various types of orthopedic prostheses in late 1970s were introduced into the Norwegian market without adequate studies. This resulted in a significant increase in the number of revision surgeries in the

country. Norway's health field has made it possible to compare different types of prosthetics to improve the outcome of joint replacement surgery by registering joint replacement surgeries throughout Norway. Today, the Ministry of Health of Norway is responsible for monitoring the good implementation of this project, and claims that about 95% of joint surgeries being performed throughout the country are recorded in this system (12). The National Registry System (NJR) is a registry system that records all information on patients undergoing joint replacement surgery in three countries: England, Wales, and Northern Ireland. The system was implemented by the department of health in England and Wales in 2003 and by the Northern Ireland Ministry of Health in 2013. This registry now includes all joint replacement surgery including hip, knee, shoulder, elbow and wrist. The registry office has been assigned by the UK Health Ministry today to a consortium of the Royal British Academy of Medicine and the Royal British Nursing and Rehabilitation Academy under the umbrella of the Health Care Quality Improvement Partnership (HQIP) (13). The unique graphical features in our system facilitate the implementation of the program in all hospitals even with minimal internet speed. On the other hand, pre-designed icons accelerate the user's input of the information and reduce the risk of error in the input of information. In case of a problem, while working with the system, it is possible to communicate directly with system guides online in the system.

The goal of the next phase of the study is to execute the second and third level of the registry; complications of the surgeries and risk factors associated with surgical outcomes can be recorded in the system. By registering the outcomes, based on functional scoring systems, we can find out the negative and positive factors that affect the outcomes of the surgeries. This is an important step in reducing the number of revisions and subsequently the financial burden. This will improve patients' satisfaction with the above mentioned surgical procedures. This will be achieved by mapping the epidemiological pattern of joint replacement surgery across the country. Through the introduction of patient information across hospitals, the registry is able to identify unwanted complications associated with non-standard prostheses.

On the other hand, it provides comprehensive information on the types of surgeries, their frequency, and the purpose of these surgeries. In addition, by evaluating the outcome of patients in the next phases of the registry, we will be able to eliminate negative factors as much as possible into an important step in improving community health and improving the quality of joint replacement surgery.

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