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Is it possible to use hospital discharge records to perform survival analysis when the operated side is not available? A Bayesian imputation mechanism to overcome this issue

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Introduction

The Italian Arthroplasty Registry (RIAP) is organized as a federation of regional registries. Participation is voluntary, completeness is highly variable among the regions (4%-100%) and a unique patient identifier is not available everywhere. Overall, RIAP covers 34% of the national volume.

Hospital Discharge Data (HDD) covers all the discharges performed at national level and is available for RIAP for 17 years (2001-2017) to perform epidemiological studies.

Italian HDD does not consider the operated side, making it impossible to carry out classical survival analysis.

Aim of this study is to define a method to estimate which is the primary procedure related to each revision recorded in HDD and then be able to estimate the overall national revision rate.

Materials and Methods

Information available from registries and from clinical studies about the correlation between the lifespan of an implanted prosthesis and the causes of its revision was used in order to elicit prior probabilities for a revision procedure on a specific patient to be linked to the previous replacement on the same joint.

The available RIAP data was used to update prior probabilities in the spirit of Bayesian approach.

The resulting posterior probabilities were used to assign to each revision procedure the related primary operation.

Results

This technique provides the information that we would have by imputing the "side" variable making data complete enough to follow up the devices implanted on a patient.

Discussion/Conclusion

By using this method, it is possible to perform survival analysis even in countries where the registry is not yet implemented or the national completeness is low.

Notes