

Clinical Prediction Rules and Clinical Decision Rules: Need for Bridging the Knowledge Translation Gap from Evidence into Orthopaedic Clinical Practice

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Abstract

Clinical prediction rules (CPR) or clinical decision rules (CDR) facilitate clinical decision-making by utilizing a combination of presenting symptoms and signs in a person with orthopaedic disorder to predict his/her diagnosis, therapy responses and outcomes. This editorial presented the importance of CPR/CDRs in Evidence-based Orthopaedic clinical practice, and there is need to explore CPR/CDRs in disease-specific, procedure-specific and population-specific domains in the future.

Keywords: Knowledge Translation; Evidence Based Practice; Orthopaedic Decision Making; Clinical Orthopaedics.

Clinical prediction rules (CPR) or clinical decision rules (CDR) facilitate clinical decision-making by utilizing a combination of presenting symptoms and signs in a person with orthopaedic disorder to predict his/her diagnosis, therapy responses and outcomes [1]. They are clinical decision support tools that synthesize evidence for use in everyday practice which need to follow specific guidelines prior to development: identifying the need for the rule, carefully defining the outcome variable, identifying and selecting the possible predictor variables, and guidelines for initial testing [2]. A knowledge-based data analytical approach for creating CPR/CDRs from documented medical records should integrate medical knowledge into statistical analysis [3].

CPR/CDRs reduce the uncertainty inherent in orthopaedic clinical practice by defining how to use clinical findings to make predictions, and they can help physicians identify patients who require diagnostic tests, treatment, or hospitalization [4]. CPR/CDRs should describe the mathematical technique used to develop the rule, be clinically sensible, define outcome and predictive variables,

assess in a blinded method, with prospective validation, reproducibility testing for predictive variables, and, measure the effect of the rule on clinical use [5].

CPR/CDRs are valuable tools to Evidence-based practice by helping organize research evidence into standardized patient assessments and treatments, thereby increasing the probability of attaining the desired outcome and reducing uncertainty in practice [6]. Evaluating CPR/CDRs should include whether CPR/CDRscan do so in a variety of settings (especially in settings similar to one's own), and that using it will likely result in improved patient outcomes at no additional cost (or conversely, that it will lower costs with no adverse effect on clinical outcomes) [7]. However, organizational factors, cognitive factors, social factors, and motivational factors influence knowledge translation (KT) of evidence-based clinical algorithms derived from CPR/CDRs [8].

Whilst use of CPR/CDRs for translating clinical research into clinical practice should follow the steps for evaluation listed by Reilly and Evans; [9]

“standards of evidence for developing and evaluating prediction rules; important differences between prediction rules and decision rules; how to assess the potential clinical impact of a prediction rule before translating it into a decision rule; methodologic issues critical to successful impact analysis, including defining outcome measures and estimating sample size; the importance of close collaboration between clinical investigators and practicing clinicians before, during, and after impact analysis; and the need to measure both efficacy and effectiveness when analyzing a decision rule’s clinical impact.”

Ingui and Rogers [10] described the MEDLINE search strategy to retrieve CPR/CDRs as follows; “the filter “predict\$ OR clinical\$ OR outcome\$ OR risk\$” retrieved 98 percent of clinical prediction rules. Four filters, such as “predict\$ OR validat\$ OR rule\$ OR predictive value of tests,” had both sensitivity and specificity above 90 percent. The top-performing filter for positive predictive value and positive likelihood ratio in the validation set was “predict\$.ti. AND rule\$.”

Critical appraisal of CPR/CDRs for their relevance, quality and applicability should be performed in terms of internal and external validity to optimize treatment selection for musculoskeletal conditions [11]. McGinn et al [12] considered “CDRs that have been validated in a new clinical setting to be level 1 CDRs and most appropriate for implementation. Level 1 CDRs have the potential to inform clinical judgment, to change clinical behavior, and to reduce unnecessary costs, while maintaining quality of care and patient satisfaction.” Cook et al developed QUADCPR- a quality checklist for prescriptive CPR/CDRs using Delphi methods [13]. Knowing how to use CPR/CDRs is essential prior to applying their findings into routine practice of care [14].

Ebell [15] listed the desirable qualities of as follows; “valid (make accurate predictions of risk), relevant (have been shown to improve patient-oriented outcomes), are easy to use at the point of care, are acceptable (with good face validity and transparency of recommendations), and are situated in the clinical context.”

McGinn et al [16] presented “3 teaching tips aimed at helping clinical learners use clinical prediction rules and to more accurately assess pretest probability in every day practice: The first tip is designed to demonstrate variability in physician estimation of pretest probability. The second tip demonstrates how the estimate of pretest probability influences the interpretation of diagnostic tests and patient management. The third tip exposes learners

to various examples and different types of Clinical Prediction Rules (CPR) and how to apply them in practice.”

Evaluation of routine usage of CPR/CDRs is essential to identify facilitators and barriers for the knowledge translation process in EBP [17], which again undergo a thorough ongoing process of validation, updating and impact evaluation [18]. Impact analysis studies remain the most efficient way of assessing whether incorporating CPRs into a decision making process improves patient care [20]. Acceptability of CPR/CDRs should also be explored cross-nationally using instruments such as Ottawa acceptability of decision rules instrument (OADRI) [21].

This editorial presented the importance of CPR/CDRs in Evidence-based Orthopaedic clinical practice, and there is need to explore CPR/CDRs in disease-specific, procedure-specific and population-specific domains in the future.

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