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FULL TEXT LINKS

[Review](#) [Rheumatol Int.](#) 2020 Dec;40(12):1921-1939. doi: 10.1007/s00296-020-04691-5.

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Cardiovascular risk assessment in patients with rheumatoid arthritis using carotid ultrasound B-mode imaging

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Abstract

Rheumatoid arthritis (RA) is a systemic chronic inflammatory disease that affects synovial joints and has various extra-articular manifestations, including atherosclerotic cardiovascular disease (CVD). Patients with RA experience a higher risk of CVD, leading to increased morbidity and mortality. Inflammation is a common phenomenon in RA and CVD. The pathophysiological association between these diseases is still not clear, and, thus, the risk assessment and detection of CVD in such patients is of clinical importance. Recently, artificial intelligence (AI) has gained prominence in advancing healthcare and, therefore, may further help to investigate the RA-CVD association. There are three aims of this review: (1) to summarize the three pathophysiological pathways that link RA to CVD; (2) to identify several traditional and carotid ultrasound image-based CVD risk calculators useful for RA patients, and (3) to understand the role of artificial intelligence in CVD risk assessment in RA patients. Our search strategy involves extensively searches in PubMed and Web of Science databases using search terms associated with CVD risk assessment in RA patients. A total of 120 peer-reviewed articles were screened for this review. We conclude that (a) two of the three pathways directly affect the atherosclerotic process, leading to heart injury, (b) carotid ultrasound image-based calculators have shown superior performance compared with conventional calculators, and (c) AI-based technologies in CVD risk assessment in RA patients are aggressively being adapted for routine practice of RA patients.

Keywords: Arthritis; Atherosclerosis; Cardiovascular disease; Carotid artery diseases; Carotid intima-media thickness; Inflammation; Rheumatoid; Risk assessment.

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graph TD
    SO[Search Objective] --> FS[Find a Solution]
    SO --> FAS[Find all Solutions]
    FS --> GS[Generate a Solution]
    GS --> ES[Evaluate Solution]
    ES --> AS[Accept Solution]
    AS --> TS[Termination Yes]
    AS --> RS[Reject Solution]
    RS --> GNS[Generate a new Solution]
    GNS --> ES
    ES --> AS
    RS --> TN[Termination No]
    TN --> GNS
    TN --> TS
  
```

Fig. 1 Flow diagram for the search...

Fig. 2 Pathophysiological association between rheumatoid arthritis...

The figure consists of four panels arranged in a 2x2 grid, labeled (a) through (d). Each panel shows a longitudinal B-mode ultrasound image of a carotid artery. A yellow line is drawn along the intima-media boundary. In panels (b) and (d), white arrows point to specific features on the plaque surface, and a yellow line highlights a segment of the plaque. Panel (a) shows a plaque with a yellow line. Panel (b) shows a plaque with a yellow line and a white arrow pointing to a feature. Panel (c) shows a plaque with a yellow line. Panel (d) shows a plaque with a yellow line and two white arrows pointing to features.

The diagram illustrates the generalized framework of supervised learning. It begins with 'Data Collection' leading to 'Data Preprocessing', which includes 'Data Cleaning', 'Data Transformation', and 'Data Partitioning'. This leads to 'Model Selection', which involves 'Feature Selection', 'Model Choice', and 'Hyperparameter Tuning'. The next step is 'Model Training', which includes 'Model Fitting', 'Cross-Validation', and 'Model Selection'. This leads to 'Model Evaluation', which involves 'Performance Metrics', 'Confusion Matrix', and 'ROC Curve'. Finally, the framework concludes with 'Model Deployment' and 'Monitoring & Maintenance'.

[illegible]

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