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Renal amyloidosis: An update and focus on newly described entities

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Amyloidosis is a systemic protein folding disease where insoluble 7-12 nm fibrils having a β-pleated sheet architecture are deposited in the extracellular space in different tissues. Depending on the amyloid precursor protein, there are different types of systemic and organ specific amyloidosis. Differentiating between the different types is crucial, because subsequent management depends on the type and extent of the amyloidosis. When the kidneys are involved, patients often present with proteinuria. Amyloidosis is seen in up to 5% of adult patients with nephrotic syndrome. Proper interpretation of findings on a kidney biopsy is crucial. Pathologic diagnosis requires special stains, immunofluorescence and electron microscopy. Mass spectrometry is sometimes necessary for definite characterization of some rare types of amyloidosis and is an eligibility criterion for targeted therapy in some clinical trials. Immunoglobulin light chains (AL) and serum amyloid A protein (AA) form the basis of most common forms of amyloidosis, accounting for up to 90% of cases. While AL amyloidosis is often associated with lymphoproliferative disorders, AA amyloidosis is commonly seen with chronic inflammatory disorders including infections. Several other amyloidogenic proteins have recently been described and associated with particular histopathologic features. These include leukocyte chemotactic factor 2 (ALECT2), apolipoprotein A-IV and gelsolin. LECT2 amyloidosis is particularly seen in patients of specific ethnicities. Apolipoprotein A-IV amyloidosis shows a peculiar predilection to deposition in the medulla. This lecture will help to educate the audience about common forms of amyloidosis and gain further insight about newly described entities.

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What changes the quality of life in a hemodialysis patient - A machine learning approach

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Statement of the Problem: Lifestyle of hemodialysis patients has a significant impact on their quality of life (QOL). Physical, psychological, social, environmental, and financial factors play an important role in determining the QOL. Several studies identify the most significant correlates with a better QOL in these patients. Because, there has been no study specifically aiming at predicting a change in QOL using modern machine learning techniques, therefore, the purpose of this study is to produce a classification model for the most important positive and negative predictors for the QOL in hemodialysis patients.

Methodology & Theoretical Orientation: This is a prospective cohort study of patients on at least 3 months of hemodialysis. By the first interim analysis, a total of 78 patients were administered a proforma containing questions about demographics and the validated Urdu version of WHO BREF questionnaire for the QOL assessment by a MBBS qualified doctor on day 0 and 30. Statistical analysis was performed using SPSS version 24, while machine learning algorithms including the classification tree were generated using Orange.

Findings: A total of 78 patients were enrolled and analyzed for the first interim analysis (42 males, 36 females). The domain means of WHO BREF questionnaire for QOL were: Physical=12.9 (SD=3.7), Psychological=15.0 (SD=3.4), Social=15.2 (SD=2.75), Environmental=16 (SD=2.9) respectively. Linear regression model ($p<0.000$, $R2=0.418$), showed monthly income ($p<0.000$) and serum albumin ($p<0.000$) to be positively and significantly associated with better QOL. Among machine learning algorithms (classification tree and Naïve Bayes models), classification tree was the most accurate (AUC=83.3%).

Conclusion & Significance: Machine learning algorithms can be used to classify patients into those with higher probabilities of having a given change in QOL in future. This can in turn be used to risk stratify patients and for better utilization of health resources.

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