* Researchers have made attempts to find different ways to create additional phenotypes for AF based on certain characteristics of patients, the main solution for this is clustering. This method involves using machine learning to interpret data from patients and cluster them based on similarities in that data. The clusters are then analysed using methods like univariate analysis to identify key characteristics that differentiate clusters of individuals from each other.
* When it comes to AF there has been some clustering to identify new af phenotypes, one study has found 4 clusters which had been determined by CV risk factors and comorbidities. factors. Cluster 1 had low rated of both however 2 and 3 where characterised by the high burden of CV risk factors and comorbidities with cluster 3 have a much higher number of comorbidities than cluster 2 and cluster 4 was defined by a high level of non-CV comorbidities which contained an older group of individuals seen in the cluster. From this cluster analysis we can determine that in a treatment situation that cluster 2 ,given its lower number of comorbidities but higher amount of risk factors would benefit from early treatment and change of lifestyle factors whereas cluster 4 already are suffering from many comorbidities and where not responding to dug treatment which may suggest that they need to go forth and look for ablation as a solution (Vitolo *et al.*, 2021).
* Another study identified clusters like the first study in which the first cluster contained young men with a low prevalence of CV comorbidities however this study identified 5 clusters as opposed to 4 with gender also being a deciding factor in addition to cardiovascular risk factors a comorbidities(Saito *et al.*, 2023).
* From looking at just two studies that share similarities and differences between their clusters AF is not a simple disease and can present itself in different ways among different patients and therefore require differing tailored treatment of each type of patients. Clearly there is a need for a new phenotype of AF to be developed to provide a potential universal approach to treating AF with more specific approaches to treatment.
* However, it is worth noting that different regions seem to have different defining factors that differentiate themselves from each other penultimate reference.