Title

Investigate the effect of steroid therapy on mortality for septic patients

Abstract

There have been multiple trials for patients with Sepsis diagnosis to see if steroid therapy affect mortality. There are probably and equal number of RCT which give positive results to number of trials which show a negative result. There was a single issue of the NEJM with an RCT showing positive[1] and one showing negative[2] mortality benefits for steroid therapy! We hypothesize that sepsis is a heterogenous diagnosis, and there are some subgroups/phenotypes that will respond to steroids, and some that will not. We plan to use ML on MIMIC data to characterise who will respond.

Methods:

Cohort: patients follow Sepsis-3 criteria in MIMIC III.

Data: diagnosis, physiology and lab data

Analysis:

1. ML clustering (latent class; K-means; or other novel techniques):
   * On all data
   * On a priori assumptions
      * e.g. markers of inflammation ie more inflammatory will respond to steroids (blood tests: CRP; ESR; WCC; Bicarb; Procalcitonin)
      * e.g. diagnosis groups lung sepsis benefits more than abdominal sepsis etc.
2. Describe data-driven clusters
3. Look at those with survival benefit to steroids

Future work: Risk-score for sepsis patients that respond to steroids

Reference:

1. Annane D, Renault A, Brun-Buisson C, Megarbane B, Quenot JP, Siami S, Cariou A, Forceville X, Schwebel C, Martin C, Timsit JF. Hydrocortisone plus fludrocortisone for adults with septic shock. New England Journal of Medicine. 2018 Mar 1;378(9):809-18.
2. Venkatesh B, Finfer S, Cohen J, Rajbhandari D, Arabi Y, Bellomo R, Billot L, Correa M, Glass P, Harward M, Joyce C. Adjunctive glucocorticoid therapy in patients with septic shock. New England Journal of Medicine. 2018 Mar 1;378(9):797-808.