Clinical analytics using SNOMED CT

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How humans think and laugh

Horse goes into a bar

Barman says:
Why such a long face?
Are we natural classifiers?
Why do we need standardised vocabularies? Developing actionable insights

Clinical characteristics
Counting

Patient level Prediction
What will happen to me?

Population health estimation
Can we find a cause?
Giving meaning – semantic relationships

Rheumatoid arthritis
• Is a ‘disease’
• Has a ‘finding site’
• Has associated ‘morphology’
• Has a ‘pathological process’
• Joint structure
• Inflammation
• Autoimmune
SNOMED CT browser
Tumour necrosis factor biology
Anti-TNFα Treatment in Rheumatoid Arthritis

What is TNFα?

Tumour necrosis factor alpha or TNFα is a cytokine. Cytokines are substances released by the body during inflammation. Inflammation is a normal process generated by the body to fight against harmful bacteria and viruses. Normally, this inflammation is controlled and regulated. In rheumatoid arthritis this process breaks down, therefore the joints of patients with rheumatoid arthritis become inflamed. An excessive amount of TNFα is present in the blood and joints of patients with rheumatoid arthritis.

Research has shown that excessive production of TNFα can lead to inflammation and damage to joints. TNFα is a particularly powerful cytokine because it causes the release of other cytokines from the body (such as IL1 and IL6). Blocking TNFα can reduce inflammation and joint damage.

Currently, there are five licenced treatments, etanercept (Enbrel), infliximab (Remicade), adalimumab (Humira), certolizumab pegol (Cimzia) and golimumab (Simponi) that can block the effect of TNFα.

NICE Guidelines
Mechanism of action of TNF inhibitors
Fig. 2 Three-year cumulative hazards of serious infections in children with JIA
Hazard ratios after administration of anti-TNF inhibitors
International comparison

Forest plot of hazard ratios of serious infections from national registries.
Chronic obstructive pulmonary disease

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Clinical decision making

Actionable insights

What will happen to me?

Can we find a cause?
Information model

• Electronic health record
• Problem listing
  • SNOMED CT
• e-Prescribing
  • SNOMED CT
• Data service running on the structured data
Cohort analysis

• Find all cases
• Find related conditions
• Find co-morbidities
• Find all similar treatments
Using relationships demonstration

• Using a synthetic dataset
• Limited set of relationships, attributes and targets
• Tool programmed for demonstration purposes by SNOMED CT development team