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Hyperparathyroidism & Stroke

systematic review + meta-analysis

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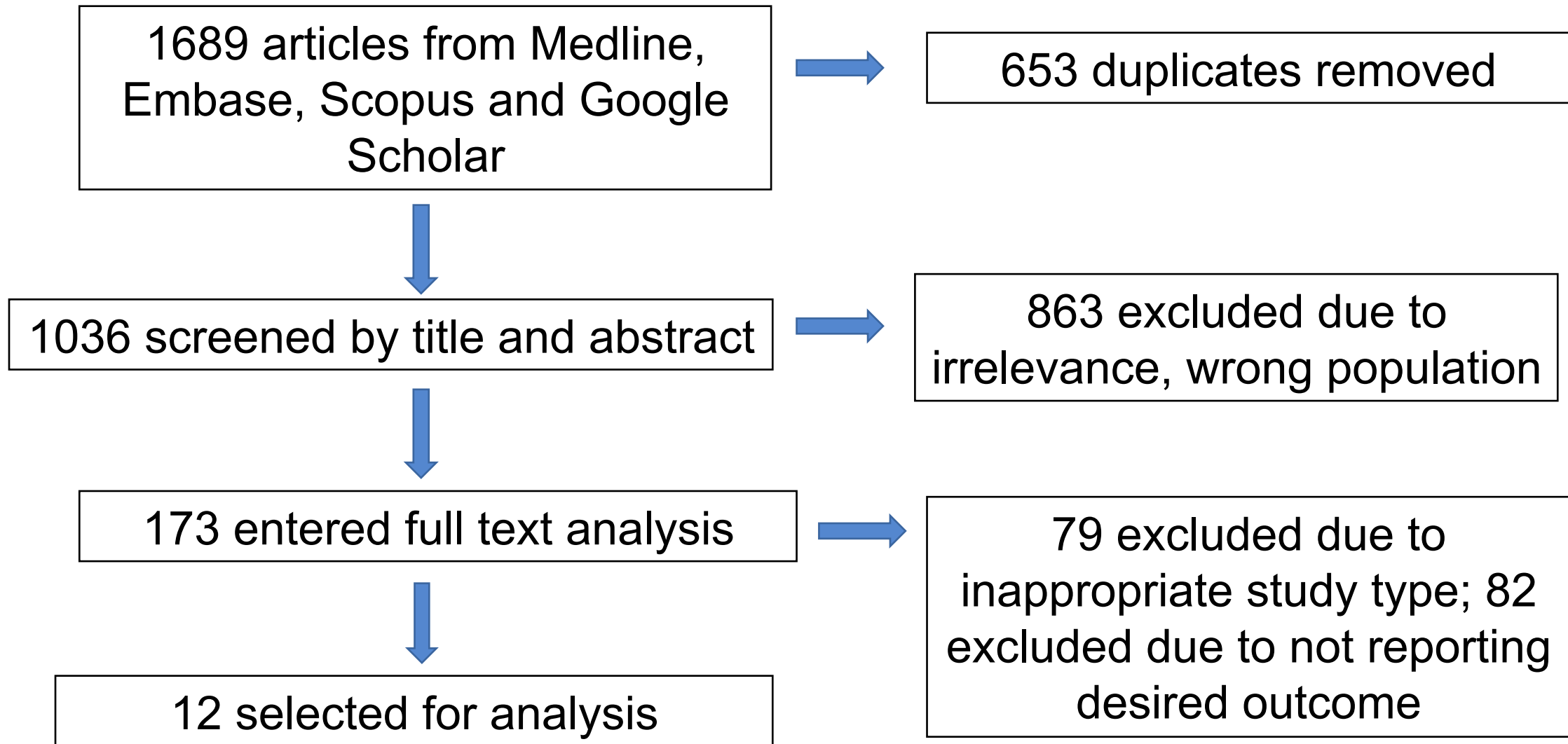
- PTH: increases blood calcium level by acting on bone, kidneys and intestine.
- PTH also acts on the endothelium and the myocardium. Excess can lead to: ↑ vascular stiffness + calcification; hypertension; ↑ cardiac contractility
- Recent systematic review and meta-analysis have concluded that excess PTH is linked to increased cardiovascular mortality.



Could excess PTH be similarly linked to risk of stroke?

- Why do we care?
 - Stroke is a leading cause of mortality and morbidity.
 - Hyperparathyroidism is a common and treatable condition.
- Studies available in current literature report inconsistent results regarding association between stroke and PTH.
- Systematic review and meta-analysis can help elucidate the connection through enhanced statistical power from large combined sample size.

Method



Group 1

Normal

High PTH



Compare incidence of stroke

Group 2

Normal

Stroke



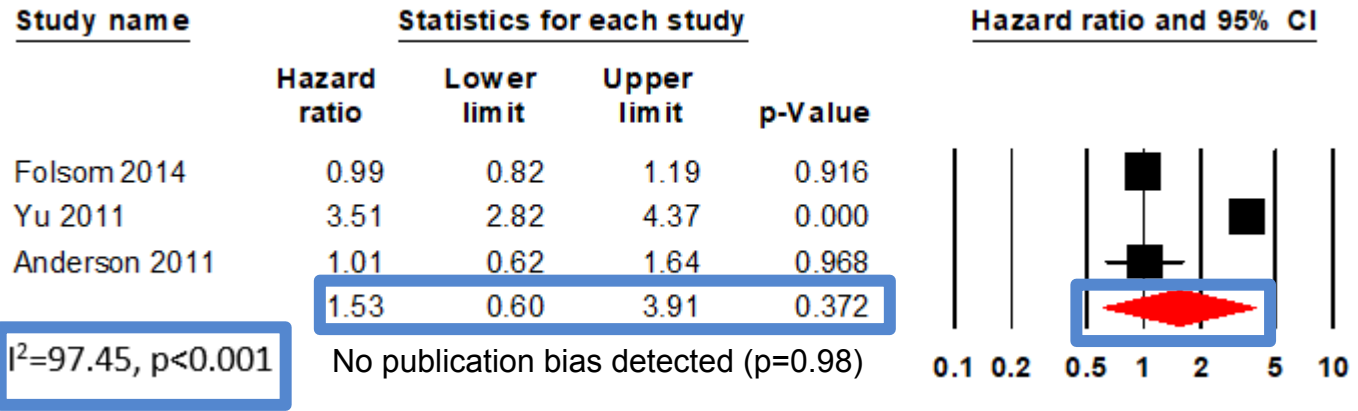
Compare incidence of high PTH

Group 1 (size 96,459)

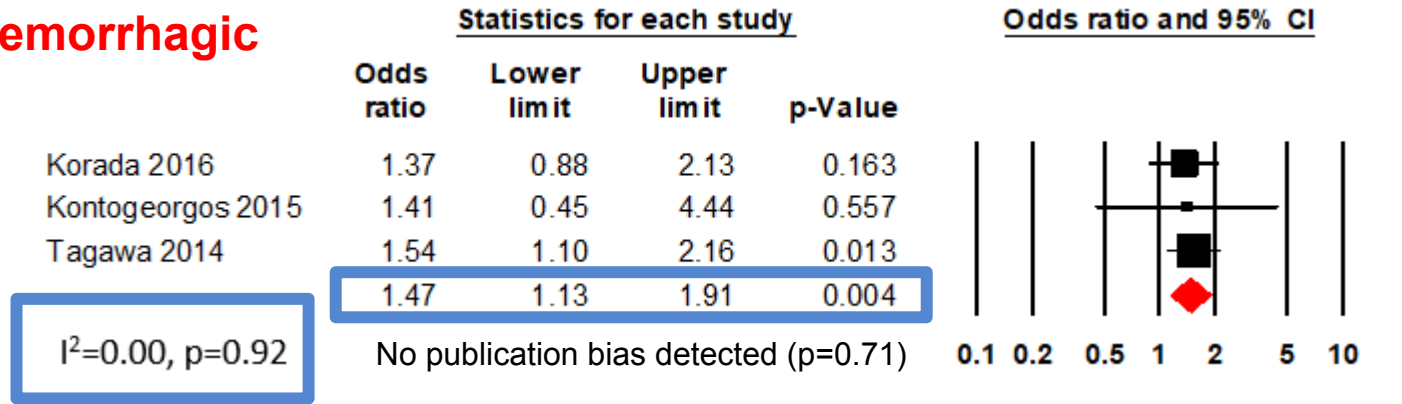
First author	Year	Total size	Study type	NOS
Korada	2016	1,703	Cohort	8
Kontogeorgos	2015	608	Cohort	7
Tagawa	2014	65,849	Longitudinal	8
Folsom	2014	10,392	Cohort	8
Yu	2011	8,544	Cohort	8
Anderson	2011	9,369	Cohort	7

Group 2 (size 2153)

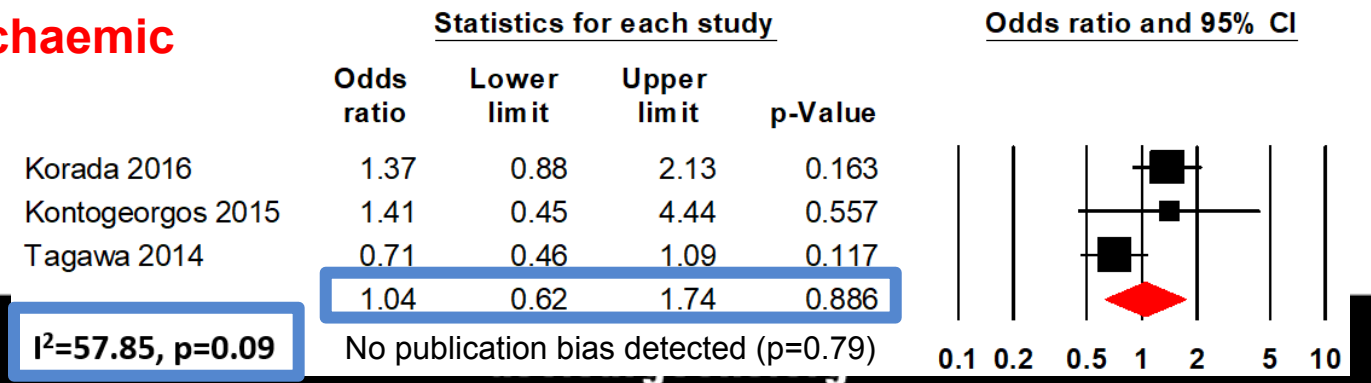
First author	Year	Total size	Study type	NOS
Celik	2017	200	Case control	8
Tan	2017	404	Case control	7
Kuyumucu	2014	1078	Case control	9
Gupta	2014	143	Cross-sectional	9
Altay	2013	114	Case control	4
Sato	2003	214	Case control	8

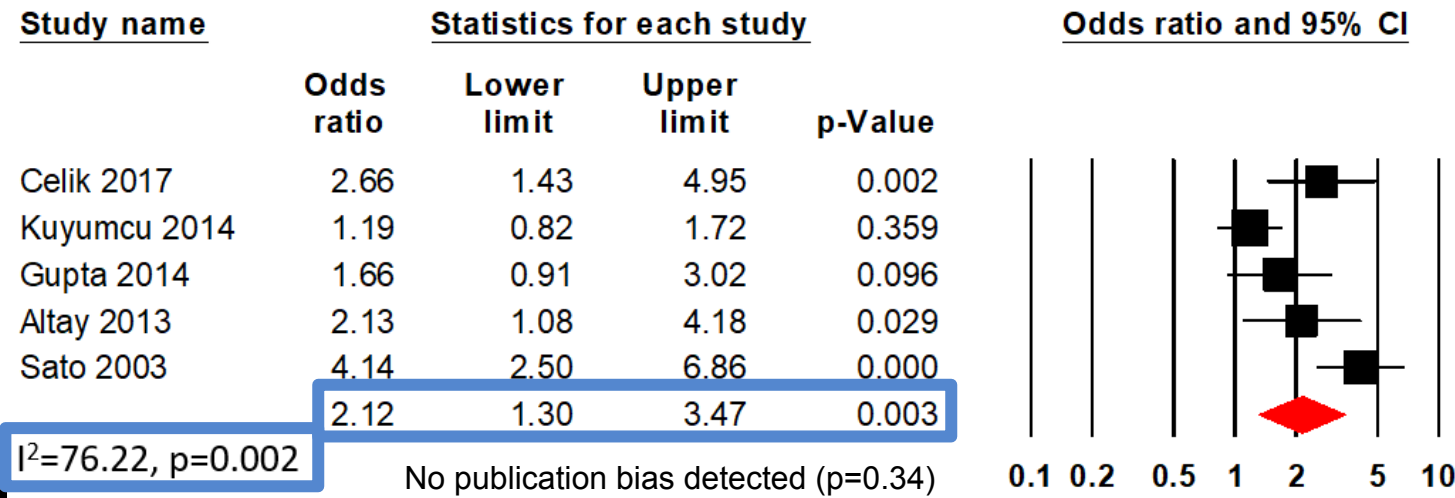
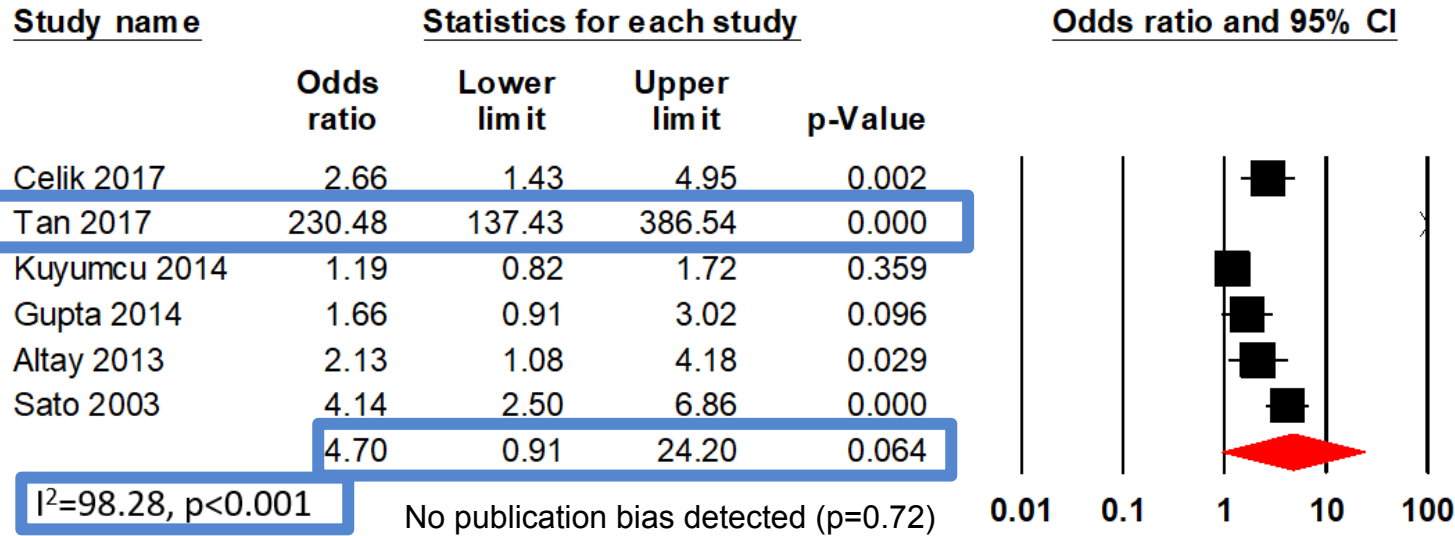


Haemorrhagic



Ischaemic





- Strengths:
 - Good quality of studies overall
 - Good population size
 - No publication bias detected
- Limitations:
 - Substantial statistical heterogeneity limits interpretation
 - Causal relationship between PTH and stroke could not be established
- Future studies should assess:
 - Effect of PTH on ischaemic stroke compared to haemorrhagic stroke, as well as fatal compared to non-fatal events
 - Stratified meta-analysis by gender, age and race may be of clinical interest

Group 1

Normal

High PTH



High PTH = 1.5 X risk of stroke

Group 2

Normal

Stroke



Stroke = 2 X risk of high PTH