**Title:**

Is there a non-invasive biomarker for the early detection of ovarian torsion: a systematic literature review

**Objectives:**

The objectives are as follows:

To assess whether there is a non-invasive biomarker that can be used to diagnose early-stage ovarian torsion

**Description of the condition:**

Ovarian torsion is a gynaecological emergency whereby the ovary (and/or the fallopian tube) twists around the ligaments that hold it in place. This can lead to ischaemia and necrosis which can then cause the ovary to die.

**Why is it important to do this review?**

Ovarian torsion is a serious condition which can lead to loss of function of the ovary. This can be prevented by early surgical intervention hence early detection is key to preventing loss of function. Ultrasound is typically used to diagnosed ovarian torsion however surgical intervention is often needed to make a definitive diagnosis. Despite being a medical emergency ovarian torsion is often diagnosed late highlighting the need for alternative diagnostic methods. Use of serum tests could be a solution and there have been numerous studies aimed at identifying biomarkers for ovarian torsion. Currently, there is no review of these studies thus is it’s important to conduct a systematic review to establish whether there is a non-invasive biomarker that can be used to diagnose early-stage ovarian torsion.

**Inclusion criteria:**

* Primary literature sources: keep reviews in until I’ve done screening use these to snowball
* Humans
* English language
* Diagnosed with ovarian torsion
* Biomarkers in the blood
* Globally
* Quantified the biomarker expression
* Quantitative biomarkers

**Exclusion criteria:**

* Non-English language
* Biomarkers are not directly quantified (qualitative biomarkers)
* Animal models and cell lines
* Disease other than ovarian torsion
* Biomarkers for ovarian cancer

**Search methods: (search terms and databases used)**

I will perform all searches for biomarkers in ovarian torsion using the following terms:

biomarker\* OR “biological marker\*” OR “metabolic process” OR “disease diagnosis” OR “molecular marker\*” OR “signature molecule\*” OR “bio\* indicator\*” OR “blood indicator\*”

Blood OR “blood sample\*” OR “blood analysis” OR “urine” OR “urine sample\*” OR “urine cytology” OR “urine test\*” OR “urinalysis”

“Ovar\* torsion” OR “Adrexal torsion”

I will use the following databases:

* Pubmed
* Medline
* Google scholar
* Web of Science
* SOCPUS

**Data collection and analysis:**

Selection of studies:

I will use Excel to exclude any duplicates of studies from the databases I’ve searched. Then I will screen the titles of the studies then following this I will screen the abstracts of the identified papers. Only the most up-to-date studies will be included. I will then identify the studies that meet the inclusion criteria. Another author will also assess the eligibility of the articles identified.

Data extraction and management:

The following data will be identified from the studies

* Quantified biomarker expression
* Study methodology
* Type of specimen used (specifically blood or urine sample)
* Sample size
* Outcomes
* Sensitivity and specificity of the biomarker