The Tubo-ovarian abscess study (TOAST): A single-center retrospective review of predictors of failed medical management International Journal of Gynecology & Obstetrics 2025

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#### **INTRODUC TION**

Tubo-ovarian abscess (TOA) : an inflammatory mass involving the fallopian tube and ovary usually resulting from infection ascending from the lower genital tract

## CONSEQUENCE

- ✤ Abscess rupture : result in life-threatening peritonitis
- long-term consequences include: subfertility, ectopic pregnancy, and chronic pelvic pain

First-line management of TOA is

Broad-spectrum intravenous (IV) antibiotics

At least 30% of patients may require further intervention via guided drainage or surgery

In 2019, Fouks et al. published a clinical risk score for predicting the failure of conservative treatment in those with TOA

The risk scoring system is based on age, white cell count, abscess diameter, and bilaterality

The aim of this study:

Determine the clinical characteristics associated with medical treatment failure

Secondary aim: evaluate the use of the score system developed by Fouks et al. to predict those who required surgical intervention

### METHODS AND MATERIAL S

This was a single-center retrospective cohort study

#### **Inclusion criteria**:

non-pregnant persons admitted between January 1, 2012 and December 31, 2018 with a radiologically or surgically proven TOA

Radiologically proven TOAs: where a computed tomography or ultrasound scan reported an adnexal mass consistent with or suspicious for a TOA.

Surgically proven TOAs: where an inflammatory mass involving the Fallopian tube and/or ovary was described at surgery

#### **Exclusion criteria:**

Pelvic mass thought to be due to non-infective pathology (e.g., uncomplicated endometrioma) Uncomplicated pelvic inflammatory disease (PID)

All patients with suspected TOA receive

- IV ceftriaxone 2 g daily until apyrexial for 48 h, twice-daily
- Oral doxycycline100 mg and metronidazole 400 mg for 14 days.
- IV gentamicin is added if no improvement occurs within 24–48 h

If there is no improvement or if there is clinical deterioration drainage to be arranged after 24–48 h of medical therapy

Surgical intervention involves

Drainage of abscess, removal of adnexa (adnexectomy), or pelvic clearance via either laparoscopic or open procedure.

Radiological intervention involves Drainage of the TOA via interventional radiology Case note review was performed to ensure

- Inclusion criteria
- Obtain demographics :(age, ethnicity), medical history, BMI, smoking status
- Presence of diabetes, recent surgery, presence of intrauterine contraceptive device (IUCD)
- Prior history of PID, sexually transmitted infection [STI] or TOA)
- Presenting signs (pyrexia with temperature of  $\geq 37.5^{\circ}$ C)
- Imaging (modality, abscess measurements, uni/bilaterality)
- Admission/readmission information
- Surgical details collected include approach
   Open or laparoscopic
   Drainage versus tissue removal
   Complications

#### RESULTS

There were 522 admissions with TOA for 425 patients over the study period

Most admissions (504/522, 96.4%) :based on radiological findings (17/19, 89.5%) diagnosed by surgery and most of them were in the early intervention group

Most patients (450/522, 86%,) : managed medically In the 72/522 (14%) admissions who had **early intervention** 68/72 (94%) : managed surgically 4/72 (6%) : radiological drainage of TOA

Medical management was **successful** in 293/450 (65.1%) Further intervention prior to discharge (**failed medical management**) :157/450 (34.9%)

Further intervention was predominantly surgical (139/157,88.5%) Few (18/157, 11.5%) cases undergoing radiology-guided drainage



Successful Compared with unsuccessful medical management of TOA :

- Less likely to be febrile on admission (33.1% vs. 49.7%),
- Had TOAs that were smaller (mean largest diameter 65 mm [IQR 65–80] vs. 77 mm [IQR 63.0–93.0]), and Had lower inflammatory markers on admission (CRP 89.5 mg/L [IQR 27–164.5] vs. 143.0 mg/L [78.0–250.0

The factors associated with failed medical management after multivariable analyses Presence of fever (temperature of 37.5°C or higher) on admission Larger mean TOA diameter (2% higher odds for every 1-mm increase in abscess size) and Higher CRP (1% higher odds for every unit increase in CRP) (1.00 [1.00–1.01]).

	Successful medical (n=293)		Failed medical (n=157)		Unadjusted OR (95% CI)	Р	Multivariable adjusted OR (95% CI)	Р	
Age (years)	40.0 (31.0-46.0)		40.0 (32.0-46.0)		1.00 (0.98-1.02)	0.732	1.00 (0.97-1.02)	0.642	
Ethnicity									
Māori	68	23.2%	51	32.5%	1.17 (0.64–2.14)	0.088	0.98 (0.49-1.95)	0.158	
Pacific Island	154	52.6%	65	41.4%	0.66 (0.37-1.15)		0.59 (0.31-1.10)		
Asian	29	9.9%	14	8.9%	0.75 (0.34-1.67)		0.83 (0.35-1.96)		
European/other	42	14.3%	27	17.2%	Ref		Ref		
Fever (≥37.5°C)	97	33.1%	78	49.7%	2.00 (1.34-2.97)	0.0006	1.72 (1.11-2.67)	0.016	
Abscess characteristics									
Bilateral abscesses	62	21.2%	43	27.4%	1.41 (0.90-2.20)	0.137	1.50 (0.91-2.47)	0.111	
Maximum diameter (mm)	65.0 (51.0-80.0)		77.0 (63.0-93.0)		1.02 (1.01–1.03)	<0.0001	1.02 (1.01-1.03)	0.0001	
History-based risk factors									
Diabetes mellitus	51	17.4%	32	20.4%	1.22 (0.74-1.99)	0.438	1.09 (0.61-1.93)	0.779	
Prior PID, TOA	130	44.4%	69	43.9%	0.98 (0.67-1.45)	0.932	1.07 (0.69-1.67)	0.767	
IUCD in situ	53	18.1%	36	22.6%	1.35 (0.84-2.17)	0.220	1.34 (0.78-2.28)	0.287	
Admission laboratory values									
WCC (×10 <sup>9</sup> /L)	14.2 (10.9–17.1)		15.2 (11.9-18.4)		1.04 (1.00-1.08)	0.035	1.00 (0.95-1.04)	0.824	
CRP (mg/L)	89.5 (27.0–164.5) <sup>a</sup>		143.0 (78.0-250.0)		1.01 (1.00-1.01)	< 0.0001	1.00 (1.00-1.01)	0.007	
Creatinine (umol/L)	67.0 (60.0-78.0) <sup>b</sup>		67.0 (60.0-78.0)		1.00 (0.99-1.00)	0.209	0.98 (0.99-1.00)	0.342	

 TABLE 2
 Admission features predictive of medical treatment failure in patients with tubo-ovarian abscess (TOA).

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# Laparoscopic surgical approach was favored in both early surgery and surgery occurring after failed medical management

Surgical morbidity/mortality was high, and similar for early or delayed surgery

Duration of stay and readmission rates within 6 weeks : higher in those with failed medical management **TABLE 3** Surgical approach and type, complications, and readmission within 6 weeks.

	Early	surgery (n = 68)	)	Surgery after fai management (n	Total surgically managed (n = 207)			
	n	%	,	n	%	n		%
Primary surgical approach								
Laparoscopy	35	51	1.5%	79	56.8%	114		55.1%
Laparotomy	33	48	8.5%	59	42.4%	92		44.4%
Posterior colpotomy	0	-		1	0.7%	1		0.5%
Surgery type								
Drainage/washout	53	77	7.9%	99	71.2%	152		73.4%
Adnexectomy	15	22	2.1%	29	20.9%	44		21.3%
Pelvic clearance	0	-		11	7.9%	11		5.3%
Complication within 6 weeks								
Wound complication <sup>a</sup>	5	7.4	4%	12	8.6%	17		8.2%
Thromboembolism	0	-		0	-	0		-
Visceral injury <sup>b</sup>	0	-		7	5.0%	7		3.4%
Death	1	1.	5%	1	0.7%	2		1.0%
Composite (any of above	e) 6	8.	8%	20	14.4%	26		12.6%
	Early surgical ( $n = 68$ )		Successfu	Successful medical (n = 293)		l n = 157)	Total (n = 522)	
Length of stay (day) (median, IQR)	5.1 (4.0-6.7)		3.4 (2.5-4.7)		6.8 (5.2-8.5)		4.6 (3.0-6.6)	
Readmission within 6 weeks (n, %)	9	13.2%	53	18.1%	33	21.1%	96	18.3%

The Fouks et al. prediction model was applied to the group who initially were intended for medical management (n= 450)
This was not as strongly predictive in this population
AUC of 0.62 (95% CI 0.57–0.67) compared with the AUC 0.73 (95% CI 0.68–0.77) reported in the original study

**TABLE 4** Risk score as a categorical predictor of medical management success versus failure. The risk assessment score as described by Fouks et al.<sup>2</sup> = { $[1 \times age (>36 \text{ years})] + [1 \times mean \text{ white cell count} (\geq 16 \times 1000/\text{mm}^3)] + [2 \times abscess \text{ diameter} (\geq 70 \text{ mm})] + [1 \times bilateral abscess}]$ . This gives a resulting score of 0–5. As in the original article, the scores were used to define four risk groups: Group A, score of 0; group B, score of 1–2; group C, score of 3–4; and group D, score of 5.

		Successful medical (n = 293)		Failed medical (n = 157)				
		n	%	n	%	Odds ratio (95% CI)	Model P-value	AUC (95% CI)
Risk score								
Group A	0	46	15.7%	12	7.6%	Ref	< 0.0001	0.62 (0.57-0.67)
Group B	1 or 2	137	46.8%	50	31.8%	1.40 (0.69–2.85)		
Group C	3 or 4	103	35.2%	85	54.1%	3.16 (1.58-6.35)		
Group D	5	7	2.4%	8	5.1%	4.38 (1.32-14.50)		
Missing		0	0.0%	2	1.3%			
Components that went into risk score <sup>a</sup>								
Age >36 year	S	176	60.1%	98	62.4%	1.10 (0.74-1.65)	0.626	
WCC ≥16×10	) <sup>9</sup> /L	100	34.1%	73	46.5%	1.68 (1.13-2.49)	0.010	
Bilateral abscess		62	21.2%	43	27.4%	1.41 (0.90-2.20)	0.137	
Max diameter ≥70 mm		123	42.0%	99	63.9%	2.44 (1.64-3.65)	< 0.0001	



### DISCUSSION

We identified that prediction of requiring intervention beyond antibiotics: larger size of the abscess higher inflammatory markers on presentation

Across cohort studies, abscess size is the only consistent predictor of failed medical management

Age, WCC, presence of diabetes, or bilaterality of abscess were not associated with treatment failure

Although definitions of treatment failure were similar, the intervention rate in Fouks et al. was higher (49.8%) than ours (34.9%)

Medical management of TOAs may be considered preferable to surgical It avoids the surgical and anesthetic risks associated with operating on a septic or unwell patient

Some specialists have stated that a period of 24–48 h of antibiotic treatment prior to surgery may reduce inflammation and improve outcomes

There is no published evidence to support this, and this is not a recommendation contained in current guidance

This cohort of patients with TOA is the largest published

TOA is diagnosed most in older women of reproductive age

Concurrent chlamydia, gonorrhea, or an IUCD in situ was low

Ethnicity was not independently associated with treatment failure Most TOA presentations occurred in Pacific women Obesity, experience higher levels of deprivation, Poorer educational outcomes and lower income levels

Others have observed that higher BMI was associated with TOA requiring surgery or drainage

Strength of this study is its large size

### Limitation:

As a single center, this may limit the generalizability of the results, Definition of treatment success being tied to discharge from hospital. Longer term outcomes(such as long-term recurrence, sub-fertility, pelvic pain) are required to best inform clinical care.

A literature review in 2009 looked at the pregnancy rates with different management approaches

laparoscopic drainage was associated with higher pregnancy rates (32% to 63%) compared with medical management alone (4% to 15%)

There is a need to prospectively collect data on management and outcomes of TOA, including long-term impact on fertility and pain outcomes

# CONCLUSION

One-third of TOAs managed medically required surgical intervention. Fever, higher inflammatory markers, and larger mass were predictive of requiring surgery

Further prospective studies are required to compare the outcomes of medical management alone with early intervention with drainage in those having risk factors predictive of treatment failure

Long-term follow-up should also be looked at, to support both shortand long-term benefits from intervention.



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