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## RESEARCH ARTICLE

# MORTALITY FACTORS IN COMPLICATE INTRA ABDOMINAL INFECTION PATIENTS: SYSTEMATIC REVIEW AND METAANALYSIS

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### ABSTRACT

**Background:** Complicated intra-abdominal infection is an infection that requires more attention associated with a poor prognosis and a fairly high mortality rate and has the second highest mortality rate in the Intensive Care Unit (ICU). This study was to assess the relationship between the extent of peritonitis, abdominal fluid characteristics, and organ source of infection with mortality in patients with complicated intra-abdominal infections. **Methods:** Meta-analytical study, retrospective cohort method, data taken from online literature search. Analyzes followed PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines and used Review Manager 5.4 software. **Results:** There were 9 literatures that matched the inclusion criteria. The relationship between the extent of peritonitis and mortality analyzed showed an odds ratio of 3.08 (95% CI 1.77-5.38), the relationship between abdominal fluid characteristics at the time of surgery and the analyzed mortality showed an odds ratio of 7.65 (95% CI 1.06-55.06), and the relationship of the source of infection from organs to mortality showed an odds ratio of 2.54 (95% CI 1.77-3.63). **Conclusion:** There is a relationship between the extent of peritonitis and mortality in the incidence of complicated intra-abdominal infections, there is a relationship between the characteristics of abdominal fluid and mortality in the incidence of complicated intra-abdominal infections, and there is a relationship between the source of organ infection and mortality in the incidence of complicated intra-abdominal infections.

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## INTRODUCTION

Intra-abdominal infection is a variety of pathological conditions ranging from uncomplicated appendicitis to faecal peritonitis. Intra-abdominal infections are divided into two categories, uncomplicated and complicated cases (Menichetti, 2009).

Complicated intra-abdominal infection is an infection that requires more attention associated with a poor prognosis and higher mortality rate (Sartelli, 2015). The Infectious Diseases Society of America states that complicated intra-abdominal infections have the second highest mortality rate in the Intensive Care Unit (ICU) (Riche, 2009).

**Research Purposes:** To determine the relationship between the extended of peritonitis, characteristics of abdominal fluid, and organ source of infection with the occurrence of mortality in patients with complicated intra-abdominal infections.

## METHODS

Metaanalytic study, retrospective cohort method. Data were taken from online literature searches, which have been published and accessed the full articles from Cochrane, Pubmed, and Science Direct. Publications are limited in the last 10 years to cohort studies.

Analyzes followed PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines and used Review Manager 5.4 software (The Cochrane Collaboration, Oxford, UK). The inclusion criteria of this study is in English, Discussed patients with complicated intra-abdominal infections whom died, and can access the full research. The exclusion criteria were studies that have types other than inclusion criteria such as review articles, case reports, experimental studies, cross-sectional and only in the form of abstracts.

## RESULTS

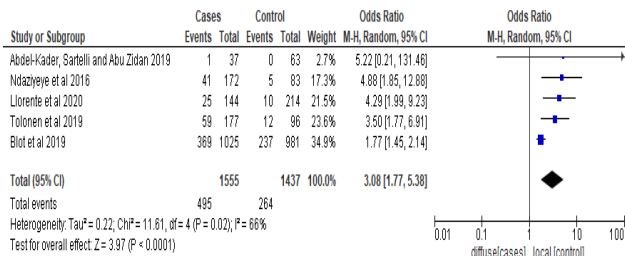
Obtained 9 literatures that match the inclusion criteria and continued with the assessment of the Newcastle-Ottawa Scale (NOS).

### Quantitative meta-analytical studies

Risk Factor	NS	Model	OR	CI95%	pHET	p value
Peritonitis Area	5	BRAKE	3.08	1.77-5.38	0.02	<0.0001*
Liquid Characteristics	2	BRAKE	7.65	1.06-55.06	0.0004	0.04*
Source of Infectious Organs	4	FEM	2.54	1.77-3.63	0.49	<0.0001*

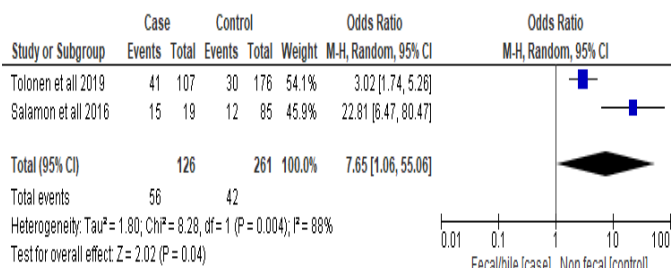
NS : Number of Study REM : Random Effect Model, FEM : Fixed Effect Model OR: Odds Ratio IK: 95% Confidence Interval, pHET: p Heterogeneity

The relationship of the extent of peritonitis with mortality. All of the journals analyzed show that the fixed-effect model produces a pooled odds ratio of 3.08 (95% CI 1.77-5.38) and does not cross the vertical OR line with the number 1



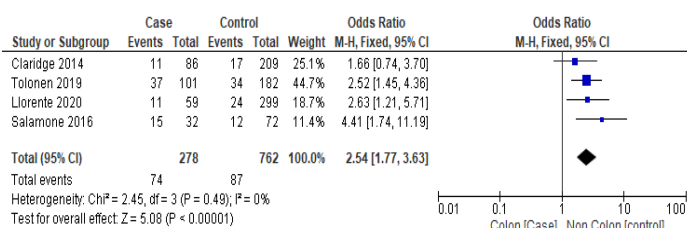
Forest Plot Association of Peritonitis Area with Mortality

(Ndayizeye, 2016; Llorente, 2020; Tolonen, 2019; Blot, 2019). Relationship of abdominal fluid characteristics at the time of surgery with mortality. All of the journals analyzed that the analysis using the random effects model resulted in a pooled odds ratio of 7.65 (95% CI 1.06-55.06) and did not cut vertical line OR with the number 1 (Tolonen, 2019; Salamone, 2016).



Forest Plot Relationship of Abdominal Fluid Characteristics with

Relationship of source of infection from organs to mortality. All journals analyzed (Llorente, 2020; Tolonen, 2019; Salamone, 2016; Claridge, 2014). Shows that the analysis using the fixed effect model produces a pooled odds ratio of 2.54 (95% CI 1.77-3.63) and does not cross the vertical OR line with the number 1



Relationship between Forest Plot Source of Organ Infection and Mortality

## DISCUSSION

There is a significant relationship between the extended of peritonitis and the mortality rate, this is evidenced by the value of  $p < 0.05$ , namely  $p < 0.0001$ . This is in accordance with the research of Salamone et al. which showed a  $p$  value of 0.029 where diffuse peritonitis was associated with mortality of complicated intra-abdominal infections. Local peritonitis has the characteristics of local infection or forms locules / certain boundaries, where the inhibition of peritoneal fibrinolysis will lead to stabilization of the fibrin exudate and limit the spread of infection, whereas diffuse peritonitis occurs when there is failure of localization, and has the characteristics of widespread infection and spread throughout the cavity. Wider spread plays a role in the occurrence of sepsis and increases the incidence of morbidity and mortality. There is a significant relationship between the characteristics of abdominal fluid at the time of surgery with the mortality rate, where fecal fluid has a mortality risk of 7.65 times greater than non-fecal. This is evidenced by the value of  $p < 0.05$ , namely  $p < 0.04$ . A wide range of confidence levels can occur due to a smaller sample/mortality event.

Infection can occur more widely because of the synergy between aerobic bacteria such as E. Coli which reduces oxygen content and facilitates the growth of obligate anaerobes such as Bacteroides fragilis, and may be accompanied by additional substances such as faecal fluid, bile or urine. This condition plays a role in localization failure and increased incidence of sepsis and mortality. There is a significant relationship between the source of infection in certain organs with the mortality rate where the source of infection in peritonitis originating from the colon has a mortality risk of 2.54 times greater than non-colon. This is evidenced by the value of  $p < 0.05$ , namely  $p < 0.00001$ . These results are in accordance with the research of Sartelli et al. with the CIAO study involving 2152 patients from 68 medical institutions in Europe, which found an association between colonic non-diverticulitis (OR 4.7, 95% CI 2.5-8,  $p < 0.0001$ ) and diverticulitis (OR 2.3, 95% CI 1.5-3.7,  $p < 0.0001$ ) with mortality in patients with complicated intra-abdominal infections.

## CONCLUSION

There is a relationship between the extent of peritonitis and mortality in the incidence of complicated intra-abdominal infections with an OR of 3.08 (CI 1.77-5.38,  $p < 0.0001$ ). There is a relationship between abdominal fluid characteristics and mortality in the incidence of complicated intra-abdominal infections with an OR of 7.65 (CI 1.06-55.06,  $p < 0.04$ ). There is a relationship between source of organ infection and mortality in the incidence of complicated intra-abdominal infections with OR 2.54 (CI 1.77-3.63,  $p < 0.0001$ )

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