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## How early is early...? The Role of Abdominal Reoperation Predictive Index at dr. Cipto Mangunkusumo General Hospital, Jakarta

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### Abstract

**Introduction.** Determining the right timing of relaparotomy has always been a challenge and hence a simple objective value is required. Abdominal reoperative predictive index (ARPI) proposed to decide when to reoperate. The study aimed to ascertain whether ARPI could be applied in decision making for relaparotomy at dr. Cipto Mangunkusumo General Hospital (RSCM), Jakarta.

**Method.** A cross sectional study carried out on those underwent relaparotomy in Department of Surgery at RSCM during period of 2009–2015. The follow-up carried out by the residents under supervision of attending surgeons, the laboratory findings were reviewed and tabulated in accordance with clinical variables of ARPI. Eight variables of ARPI were reviewed in these subjects.

**Results.** There were 30 subjects reviewed. In this study there were four frequent variables, i.e. persistent symptoms (for more than 4 days after relaparotomy), abdominal pain (that remains for 48 hours after relaparotomy), surgical site infection (90%), and ileus (70%). Seventy-three-point three percent carried out in more than 7 days after primary operation, while as only 10 percent underwent relaparotomy less than 4 days after primary operation.

**Conclusion.** ARPI is practical guide and may be implemented in helping surgeons to decide relaparotomy should there required. Low compliance lead to delay in the management and associated with high mortality.

**Keywords:** ARPI, timing, relaparotomy

### Introduction

In establishment of the timing of relaparotomy in those diagnosed with complicated intraabdominal infection (previously known as abdominal sepsis) has always been a challenge as there's reluctances in deciding the need of relaparotomy.<sup>1-3</sup> Many surgeons believed that conservative treatment has a room to treat those complicated patients. In contrast, any delay to constitute initial surgical intervention is inevitably lethal due to failure of identifying complications as well as source control. With such a delay, Multiple organ dysfunction syndrome (MODS) as the feared outcome in the septic process is followed with high mortality rate, which is of 30–40%.<sup>2,4-7</sup> The issue realized as the need of an objective parameters in establishing the timing of relaparotomy, and meant to avoid hesitation.

There were studies on the relaparotomy, but only a small number were specifically focused on the interval between initial surgery and reoperation. There were also the guidelines as well as the algorithms, but only implies to a small number of surgeons.<sup>8,9</sup> Thus, the necessity to run a review of abdominal reoperation predictive index (ARPI) proposed by Pusajo (1993)<sup>10</sup> regarding its applicability in daily medical routine has been driven.

### Method

A cross sectional study carried out on those underwent relaparotomy in Department of Surgery in dr. Cipto Mangunkusumo General

Hospital (RSCM) during period of 2009–2015. The follow-up carried out by the residents under supervision of attending surgeons, the laboratory findings were reviewed and tabulated in accordance with clinical variables of ARPI.

Table 1. The scores of abdominal reoperations predictive index (after Pusajo)

Abdominal reoperation predictive index (ARPI)	Score
Emergency surgery (at primary operation)	3
Respiratory failure	2
Renal failure	2
Ileus (72 hours after surgery)	4
Abdominal pain (48 hours after surgery)	5
Wound infection	8
Consciousness alterations	2
Persistent above symptoms on 4 <sup>th</sup> day after surgery	6

The variable of emergency on primary operation determined based on surgical reports on the medical records. Acute kidney injury (previously known as renal failure) identified in by the increment of blood urea and creatinine above its upper limit or any requirement for renal replacement therapy.<sup>11</sup> The variable of respiratory failure was identified as any abnormal respiratory rate was noted, in addition to abnormal blood gas analysis, or any requirement for positive-pressure mechanical ventilation. Ileus emerged on the first 72 hours

after relaparotomy were noted from daily follow-ups which was represented by one or more following signs or symptoms, i.e. vomiting, unable to flatulence, unable to defecate, intolerance to intake by mouth, any abdominal distention, and decreased or negative bowel sounds. Those who complained persistent or gradually increased of abdominal pain commencing the first 48 hours after relaparotomy which was unresolved with proper medication and those showing peritoneal signs were included in the variable. The variable of wound infection (recently attributed to surgical site infection, SSI) represented with positive purulent discharge from laparotomy incision.<sup>12</sup> Alteration of the consciousness identified in those with Glasgow Coma Scale decreased more than a point or less than 14. The last variable was identified persisted symptoms for more than 4 days after relaparotomy. Those underwent primary operation in other hospital and performed by another department were excluded. Compliance of the management was assessed according to the algorithm of management proposed by Pusajo (1993).

## Results

Out of thirty subjects enrolled on the study, there were sixteen subjects (53%) were males and 14 subjects (47%) were females. These subjects were of median 44 years old (17–78 years old), where 86.7% were in the productive age and only 13.3% were over 65 years (table 2).

General peritonitis was the most frequent indication of primary operation in this series (46.6%), followed by gastrointestinal

malignancy (36.7%) and blunt abdominal injury (6.7%). General peritonitis was found in three different etiologies, i.e. perforated intestinal, perforated peptic ulcer, and perforated appendicitis.

The timing of relaparotomy classified into 3 categories (table 3). Seventy-three-point three percent carried out in more than 7 days after primary operation, while as only 10 percent underwent relaparotomy less than 4 days after primary operation. Seven subjects (23.3%) underwent relaparotomies of more than a time. There were four indications of relaparotomies in this series, i.e. leaks of anastomosis which was determinant findings (53.5%), followed by mechanical bowel obstruction (26.7%), intraabdominal abscess (13.3%), and intestinal perforation (6.7%). Twelve subjects (40%) died, nine of twelve subjects (40.9%) were those underwent relaparotomy more than 7 days (table 4).

In this study there were four frequent variables, i.e. persistent symptoms (for more than 4 days after relaparotomy), abdominal pain (that remains for 48 hours after relaparotomy), surgical site infection (90%), and ileus (70%) (figure 2).

Table 2. Subjects characteristics

	n (%)
Gender (p = 0.403)	
– Males	16 (53)
– Females	14 (47)
Age (p = 0.323)	
– Productive	26 (86.7)
– Geriatric	4 (13.3)

Table 3. Mortality related to timing of relaparotomy

Timing	Frequency		Died	
	n	%	n	%
2 <sup>nd</sup> – 4 <sup>th</sup> postoperative day	3	10	1	33.3
5 <sup>th</sup> – 7 <sup>th</sup> postoperative day	5	16.7	2	40
After 7 <sup>th</sup> postoperative day	22	73.3	9	40.9
Total	30	100	11	

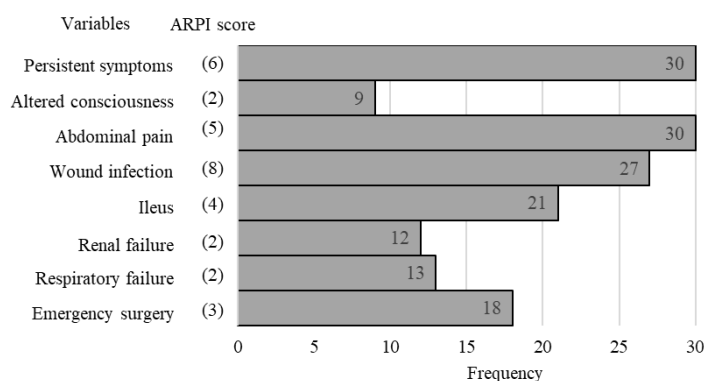


Figure 1. Frequent variables in the study

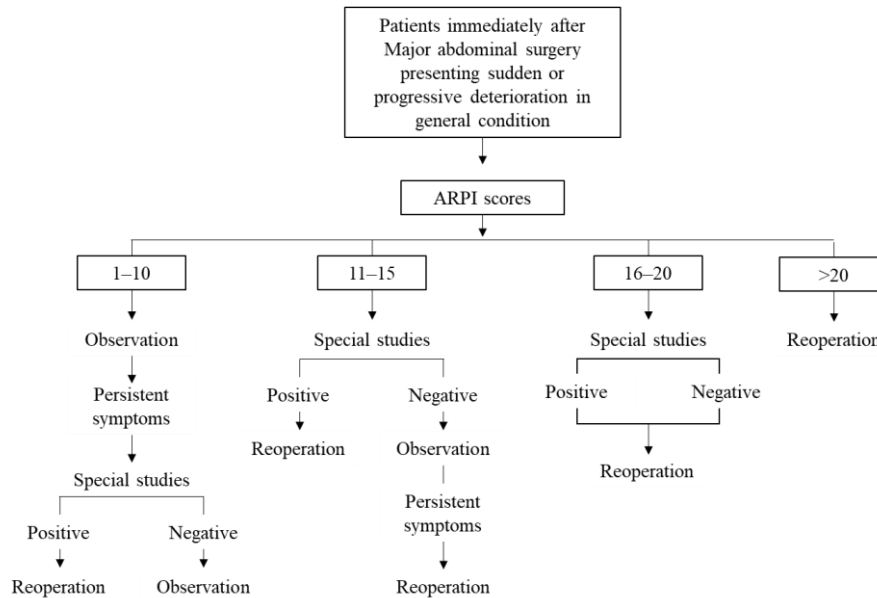


Figure 1. Decision tree employed for the Abdominal Reoperation Predictive Index (ARPI). From: Pusajo Arch Surg. 1993.

## Discussion

To decide when to re-operate remains the problem in daily clinics. Surgeons are cautiously determining the timing as there are difficulties to early identify complications that may exist and denials of any treatment failure at the first intervention. To overcome these problems, an objective measure is required. Unfortunately, available algorithms were mostly complicated as requiring some tests which not applicable.<sup>8,9</sup> An algorithm proposed by Pusajo (1993) may practically directing surgeons to decide what to do.<sup>10</sup> Authors successfully recorded and evaluated the eight variables of ARPI thoroughly.

Identification of each variables enabled authors to calculate the frequency in each subject. Thus, application of ARPI may help medical personnel of every level though not a surgeon to identify complications early. It is very effective for patients who were treated by multidisciplinary medical team. The simplicity facilitates every health professionals to administer this index routinely without complicated and costly additional tests.

Mortality is the most complication monitored. The mortality rate in this study reach up to 40%, like other reports (30–40%). We also noticed that the highest mortality rate is in those underwent relaparotomy for more than seven days after primary surgery i.e. 40.9%, while as those underwent less than four days was 33.3%. To this fact, it can be pointed that the timing of relaparotomy is a factor influencing mortality in complicated intraabdominal infection.<sup>13</sup> In fact, we can see the compliance to the decision tree according Pusajo is quite low.

Surgeons may modify this influencing factor and modify the interval of the operations using a simple objective measure as provided in ARPI. There are studies showed that the relaparotomy should be performed less than 48 hours. To this guideline, less complications found and a better outcome. Technically easier as no intraperitoneal adhesion lead the enteric injury that may be found is minimal to none, and consequently reduced mortality rate.<sup>6,14,15</sup> Sartelli (2015) reported that the re-exploration performed >48 hours is followed with a significantly higher mortality rate (76.5%), otherwise reoperation performed <48 hours showed “only” 9% mortality rate.<sup>15</sup>

In consideration to the two variables which were identified in all subjects – which are abdominal pain commencing in 48 hours after primary surgery and the persisted symptoms commencing on 4<sup>th</sup> day after primary operation – it was assumed that the decision of relaparotomy should be instituted immediately. This new fact indeed requires new study of modified available predictive index.

## Conclusion

ARPI is practical guide and may be implemented in helping surgeons to decide relaparotomy should there required. Low compliance lead to delay in the management and associated with high mortality.

## Disclosure

Author declares there is no conflict of interest in this study.

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