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# Abdominal sepsis caused by intestinal perforation treated with open abdomen: in search of predictive factors of mortality

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**Introduction.** The use of the open abdomen for the treatment of abdominal sepsis is still a controversial topic in the literature. The most frequent cause of abdominal sepsis is secondary or tertiary peritonitis due to intestinal perforation. The aim of this study was to describe the survival analysis of patients with OA for secondary peritonitis and search for predictive factors of mortality.

**Methods.** All patients with abdominal sepsis undergone OA between 2010 and 2019 were recruited. Patients with trauma, necrotizing pancreatitis, intestinal ischemia were excluded from the analysis. For each patient, anamnestic and clinical data, prognostic scores, type of temporary abdominal closure technique, number of revisions, OA duration, ICU stay, Björck’s classification at II look, definitive fascial closure (DFC) rate, morbidity and mortality were collected. A survival analysis was performed with the Kaplan-Maier method and with Cox regression

**Results.** Seventy patients were analyzed. Male gender accounted for 48.6%. Median age was 70 years (IQR 68-78), median BMI 25.0 (IQR 23.4-28.0), median Charlson – Age Comorbidity Index (CaCI) score was 5 (IQR 2-6). ASA IV was found in 49.3% of cases. Median Mannaheim Peritonitis Index and APACHE II score were 25.5 (IQR 20.8-28) and 14 (IQR 10-18), respectively. NPWT was adopted in 61.4% of cases, Vacuum-pack technique in 27.1%, and Skin-closure in 11.4%. Median number of revisions was 1 (IQR 1-1.3). Median OA duration was 2 days (IQR 2-4), and median ICU stay was 9 days (IQR 6-20). At the II look, a modified Björck grade 1A was chased in a 50% of patients. Mortality was 40%: 8.6% during OA and 31.4% after definitive closure. DFC rate was 98.4%: a prothesis was required in 15.6% of cases. Overall morbidity was 69%: 27.6% of cases required a re-intervention. Two (2.8%) entero-atmospheric fistulas were observed. At the univariate analysis of survival during OA, an MPI>30 and a CaCI score>5 were significantly frequent in deceased patients; age and MPI at the multivariate analysis. At the univariate analysis of survival after DFC, cardiologic and neurological pathology, MPI>30, APACHE II >20 were significant, while at the multivariate analysis cardiologic disease and APACHE II.

## Analysis of survival during OA

	Survival (%)	Median (days)	C.I. (95%)	Log Rank Test (p value)
MPI ≥ 30	69.2	7.0	0.0 – 14.1	0.003
MPI < 30	96.5	*	*	
CaCI ≥ 5	84.6	*	*	0.04
CaCI < 5	100.0	*	*	

Multivariate analysis			
	HR	C.I. (95%)	p value
Step 1			
Female gender	1.07	0.15 – 7.48	0.95
Age	1.16	1.01 – 1.34	0.04
CaCI	0.94	0.63 – 1.42	0.78
MPI	1.17	0.48 – 1.40	0.08
Step 3			
Age	1.16	1.01 – 1.32	0.04
MPI	1.17	1.01 – 1.36	0.05

\* Not-computable value

## Analysis of survival after DFC

	Survival (%)	Median (days)	C.I. (95%)	Log Rank Test (p value)
Cardiopathy				
Yes	50.0	16.0	*	0.03
No	71.4	44.0	30.14 – 57.86	
Neuropathy				
Yes	14.3	9.0	3.9 – 14.1	0.001
No	73.2	50.0	*	
MPI ≥ 30	33.3	15.0	0.4 – 29.6	0.01
MPI < 30	70.9	50.0	*	
APACHE II ≥ 20	42.9	7.0	0.0 – 17.3	0.003
APACHE II < 20	69.2	50.0	*	

Multivariate analysis			
	HR	C.I. (95%)	p value
Step 1			
Female gender	2.70	0.75 – 9.77	0.13
Age	0.99	0.91 – 1.08	0.82
Cardiopathy	6.91	1.69 – 28.24	0.007
Neuropathy	3.63	0.91 – 14.49	0.07
MPI	1.05	0.97 – 1.14	0.22
APACHE II	1.16	1.00 – 1.35	0.05
Step 3			
Cardiopathy	6.27	1.56 – 25.25	0.01
APACHE II	1.13	1.00 – 1.28	0.05

\* Not-computable value

**Conclusions.** Although a DFC rate high and an entero-atmospheric fistula rate very low, OA in secondary peritonitis is related to a high rate of overall morbidity and mortality. The independent predictive factors of mortality during OA were age and MPI, while the presence of cardiologic disease and APACHE II were identified after definitive closure.