Data in Brief 42 (2022) 108064

Contents lists available at ScienceDirect

Data in Brief

journal homepage: www.elsevier.com/locate/dib

Data Article

Data of postoperative complications related to fibrinogen-to-albumin ratio in pancreatic resections☆

V. La Vaccara[a], R. Cammarata[a,b], A. Coppola[a,*], T. Farolfi[a,b], C. Cascone[a,b], S. Angeletti[b,c], G. Maltese[b], R. Coppola[a,b], D. Caputo[a,b]

[a] General Surgery, Fondazione Policlinico Universitario Campus Bio-Medico, Via Alvaro del Portillo 200, Rome 00128, Italy
[b] Campus Bio-Medico University of Rome, Via Alvaro del Portillo 200, Rome 00128, Italy
[c] Unit of Clinical Laboratory Science, Fondazione Policlinico Universitario Campus Bio-Medico, Via Alvaro del Portillo 200, Rome 00128, Italy

ARTICLE INFO

Article history:
Received 21 February 2022
Revised 3 March 2022
Accepted 10 March 2022
Available online 18 March 2022

Dataset link: Database FAR (Original data)

Keywords:
Pancreatic resection
Fibrinogen-to-albumin ratio
Postoperative pancreatic fistula
Inflammation

ABSTRACT

Pancreatic surgery is one of the surgeries burdened with the highest mortality and morbidity rate. This is due both to the aggressive biological nature of the pathology affecting the organ and to the technical difficulties associated with surgery. A further aspect on which research is focusing is represented by inflammation related to oncological pathology. Inflammation plays an important role in tumor progression, and growing evidence has confirmed that the fibrinogen-to-albumin ratio (FAR) is an important prognostic factor for overall survival (OS) in malignant tumors.

Inflammatory markers had demonstrated also a role in the prediction of postoperative complication after pancreatic surgery.

We speculate that FAR, as an easily available, cost-effective, and non-invasive prognostic indicator for pancreatic cancer patients, could help to identify patients at increased risk of

☆ Alessandro Coppola has a role as Editorial Board Member of this journal but had no involvement in the peer-review of this article and has no access to information regarding its peer-review.

* Corresponding author.
E-mail address: a.coppola@policlinicocampus.it (A. Coppola).

https://doi.org/10.1016/j.dib.2022.108064

postoperative pancreatic fistula (POPF). We therefore retrospectively analyzed the data relating to 117 pancreatic resections relating direct and indirect markers of inflammation with the incidence of post-operative complications.

Specifications Table

Subject	Surgery
Specific subject area	Pancreatic resection; fibrinogen-to-albumin ratio; postoperative pancreatic fistula; inflammation
Type of data	Figure, Table
How the data were acquired	Blood collection and data analysis were performed at the Fondazione Policlinico Universitario Campus Bio-Medico of Rome
Data format	Raw, Analysed
Description of data collection	Blood collection and data analysis were performed at the Campus Bio-Medico University, Rome, Italy
Data source location	Fondazione Policlinico Universitario Campus Bio-Medico Via Alvaro del Portillo 200, 00,128, Rome, Italy
Data accessibility	With the article. Mendeley Data: doi: 10.17632/2jfd6cfctm.1
Related research article	None

Value of the Data

- The pre-operative value of, albumine, fibrinogen, FAR is associated with the prognosis of patients undergoing pancreatic resection. However, the association of these variables with complications related to pancreatic surgery has never been tested. These data can provide further guidance to better predict patients at risk of complications and improve the quality of medical assistance.
- Patients who will underwent pancreatic resections could see improved their cure and medical treatment applying these data to their clinical routine.
- These markers could be used by other physicians in order to enlarge their cohort of patients and made much more powerful statistical analysis. Enlarging the number of patients could provide stronger results and draw conclusion regarding the useful of these markers in predicting postoperative complication.

1. Data Description

We analysed the clinical indicators of all patients selected. The sample consists of 117 patients who underwent pancreatic resection from 2007 to 2021. We only included patients for whom all data were available from the subject of the study. The median age of these patients at diagnosis was 69 years (range: 29–94 years). Sixty patients (74%) were over 60 years old. Relative to the whole sample, 68 (58.1%) were male. Regarding the forms of clinical presentation, 77 (65.8%) patients went to outpatients clinics for the presence of clinical symptoms that included jaundice, pain, digestive symptoms, weight loss, and fatigue. Analysing the localization of the neoplasm, 49 patients (41.8%) had localized pathology at the level of the head of the pancreas while 64 (54.7%) at the level of the body-caudal region and finally 4 (3.5%) were characterized by pathology spread to the entire pancreatic gland. Regarding the type of surgery applied, 19.9% of patients underwent pancreaticoduodenectomy, while 49.8% underwent distal

pancreatectomy. Thirty-two patients (27.5%) underwent total pancreatectomy. The predominant histology was PDAC (70.1%). Details of the patients' baseline characteristics are shown in Table 1.

Table 2, considering patients undergoing proximal or distal pancreatic resection, shows data on the incidences of post-operative complications. Specifically, 70 patients (59.8%) in the sample developed pancreatic fistula; of these, 24 patients developed clinically relevant pancreatic fistula (Grade B and C according to the definition of POPF of International Study Group on Pancreatic Surgery). Seven patients (8.7%) developed postoperative bleeding.

Table 3 summarizes the statistical value of the variables analysed in relation to the incidence of post-operative complication, specifically of the postoperative pancreatic fistula clinically relevant. For each variable, the optimal cut-off was defined, respectively, 36 g/L for albumin, 4.46 g/L for fibrinogen and 0.09 for FAR. In this model, the optimum cut-off point for albumin level was 36 g/L, AUC was 0.779 (95%CI: 0.564–0.921), with a sensitivity of 80% and a specificity of 63,16% by the Youden's index. For fibrinogen the optimal cut-off point was 4.46 with AUC 0.779 and a sensibility and specificity of 83.33% and 72.22%, respectively. In this model, the optimum cut-off point for FAR was 0.09, AUC was 0.750 (95%CI: 0.533–0.902), with a sensitivity of 66.67% and a specificity of 83.33% by the Youden's index. Regarding the preoperative dosage of albumin, this has also been related with the incidence of post-operative bleeding in patients with pancreatic fistula. In this model, the optimum cut-off point was 36, AUC was 0.723 (95%CI: 0,504–0,884), with a sensitivity of 75% and a specificity of 68.75% by the Youden's index.

The Fig. 1 describes characteristics curve analysis based on preoperative fibrinogen concentration, albumin level, and fibrinogen-to-albumin ratio for incidence of postoperative pancreatic fistula clinically relevant. In the box A, the area under the receiver operating characteristics curve (AUC) indicates the diagnostic power of preoperative plasma fibrinogen concentration. In this model, the optimum cut-off point for fibrinogen concentration was 4.46 g/L, AUC was 0.741 (95% confidence interval (CI): 0.523–0.896), with a sensitivity of 83.33% and a specificity of 72.22% by the Youden's index. In the box B, the AUC indicates the diagnostic power of preoperative plasma albumin level. In this model, the optimum cut-off point for albumin level was 36 g/L, AUC was 0.779 (95%CI: 0.564–0.921), with a sensitivity of 80% and a specificity of 63,16% by the Youden's index. In the box C, the AUC indicates the diagnostic power of preoperative fibrinogen-to-albumin ratio (FAR). In this model, the optimum cut-off point for FAR was 0.09, AUC was 0.750 (95%CI: 0.533–0.902), with a sensitivity of 66.67% and a specificity of 83.33% by the Youden's index.

The Fig. 2 describes characteristics curve analysis based on preoperative albumin and CA19.9 preoperative concentration for incidence of postoperative hemorrhage and SSI. In the Box A, the area under the receiver operating characteristics curve (AUC) indicates the diagnostic power of preoperative plasma albumin concentration. In this model, the optimum cut-off point for fibrinogen concentration was 36 g/L, AUC was 0.723 (95% confidence interval (CI): 0.504 to 0.884), with a sensitivity of 75% and a specificity of 68.75% by the Youden's index. In the box B, the AUC indicates the diagnostic power of preoperative plasma CA 19.9 level. In this model, the optimum cut-off point was 17.7 U/L, AUC was 0.778 (95%CI: 0.495–0.946), with a sensitivity of 100% and a specificity of 66.67% by the Youden's index.

The Fig. 3 describes characteristics curve analysis based on preoperative FAR related to incidence of hemorrhage (A) and abdominal collections (B) and delayed gastric empty (DGE) (C) sepsis (D) and SSI (E) and biliary fistula (F). None of these analyses were statistically significant.

The Fig. 4 describes characteristics curve analysis based on preoperative fibrinogen related to incidence of hemorrhage (A) and abdominal collections (B) and DGE (delayed gastric empty) (C) sepsis (D) and SSI (E) and biliary fistula (F). None of these analyses were statistically significant.

Table 1
Baseline characteristics of 117 patients underwent pancreatic resection.

Characteristic	Patient, 117 n (range or percentage)
Age, in yr	69 (29–83)
> 60	94 (80.3%)
< 60	23 (19.7%)
Sex	
Male	68 (58.1%)
Female	49 (41.9%)
Clinical symptoms	
Present	77 (65.8%)
Absent	40 (34.2%)
Tumor location	
Head and neck	49 (41.8%)
Body and tail	64 (54.7%)
Multifocal	4 (3.5%)
Approaches of surgery	
Pancreaticoduodenectomy	23 (19.9%)
Distal pancreatectomy with splenectomy	58 (49.8%)
Total pancreatectomy	32 (27.5%)
Exploration surgery	3 (1.9%)
Enucleation	1 (0.9%)
Histology	
PDAC	82 (70.1%)
NET	13 (11.1%)
MCNs	7 (6%)
IPMN	5 (4.4%)
CP	3 (2.6%)
SPT	2 (1.7%)
Cholangiocarcinoma	2 (1.7%)
SCNs	1 (0.8%)
GIST	1 (0.8%)
Leiomyosarcoma	1 (0.8%)
Post-operative pancreatic fistula (POPF)	
Absent	70 (59.8%)
Present	47 (40.2%)
Biliary fistula	
Absent	105 (89.7%)
Present	12 (10.3%)
Delayed Gastric Empty (DGE)	
Absent	80 (68.3%)
Present	37 (31.7%)
Post-operative Haemorrhage	
Absent	98 (83.7%)
Present	19 (16.3%)
Abdominal Collections	
Absent	55 (57%)
Present	62 (53%)
Sepsis	
Absent	110 (94%)
Present	7 (6%)
Surgical Site Infections (SSI)	
Absent	109 (93.2%)
Present	8 (6.8%)

(*continued on next page*)

Table 1 (*continued*)

Characteristic	Patient, 117 n (range or percentage)
Clavien-Dindo Classification	
I	30 (25.6%)
II	41 (35%)
III	39 (33.3%)
IV	0
V	7 (6.1%)
Mortality within 90 days	
Absent	112 (95.7%)
Present	5 (4.3%)

Table 2
Postoperative complications in patients underwent proximal or distal pancreatic resection.

Type of complication	Patient underwent proximal or distal pancreatic resection, 81n (percentage)
Postoperative pancreatic fistula	
(POPF) clinically relevant	57 (70.3%)
Absent	24 (30.7%)
Present	
Grade* POPF	
Grade B	19 (79%)
Grade C	5 (21%)
Postoperative Haemorrhage	
Absent	73 (91.3%)
Present	8 (8.7%)
SSI	
Absent	80 (98.7%)
Present	1 (1.3%)

Table 3
Correlation between preoperative variable and incidence of post-operative complications.

Complications and associate variable	AUC (95% CI)	SE	95% CI	SP	95% CI	Significance level P (Area = 0.5)	Associated criterion
Preoperative albumine and grade C pancreatic fistula[1]	0.779 (0.564–0.921)	80.00	28.4 – 99.5	63,16	38.4 – 83.7	0.0137	≤ 36
Preoperative fibrinogen and pancreatic grade B pancreatic fistula[1]	0.741 (0.523 to 0.896)	83.33	35.9 – 99.6	72,22	46.5 – 90.3	0,0462	≤ 4.46
Grade B pancreatic fistula[1] and preoperative FAR	0.750 (0.533 to 0.902)	66.67	22,3 – 95,7	83,33	58,6 – 96.4	0,0176	≤ 0.09
Preoperative albumine and incidence of post-operative haemorrage in patients with clinically relevant pancreatic fistula	0.723 (0,504 to 0,884)	75.00	34,9 – 96.8	68.75	41,3 – 89.0	0.0400	≤ 36

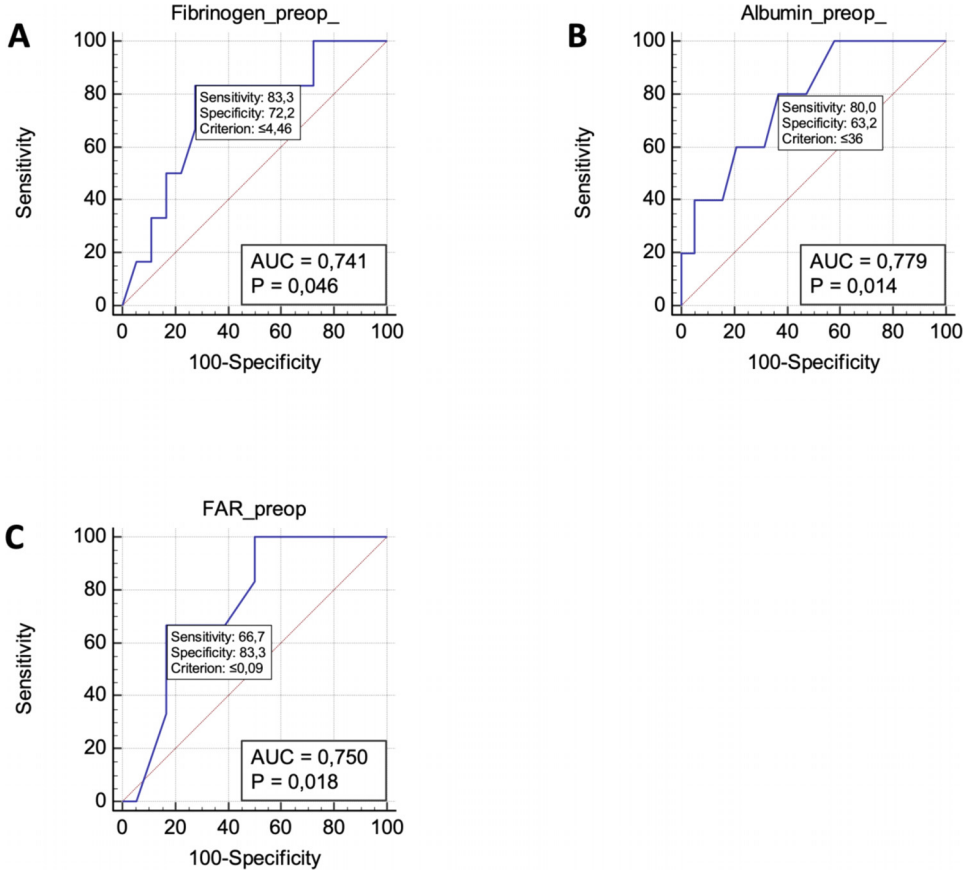

Fig. 1. xxx.

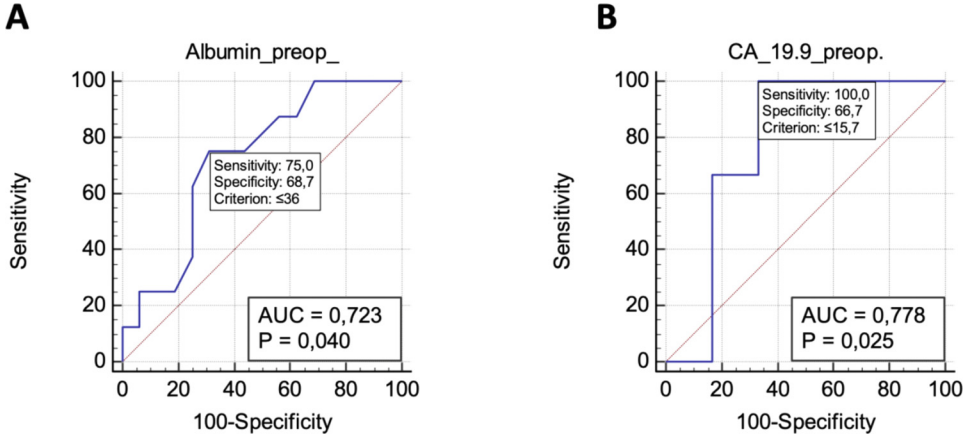

Fig. 2. xxx.

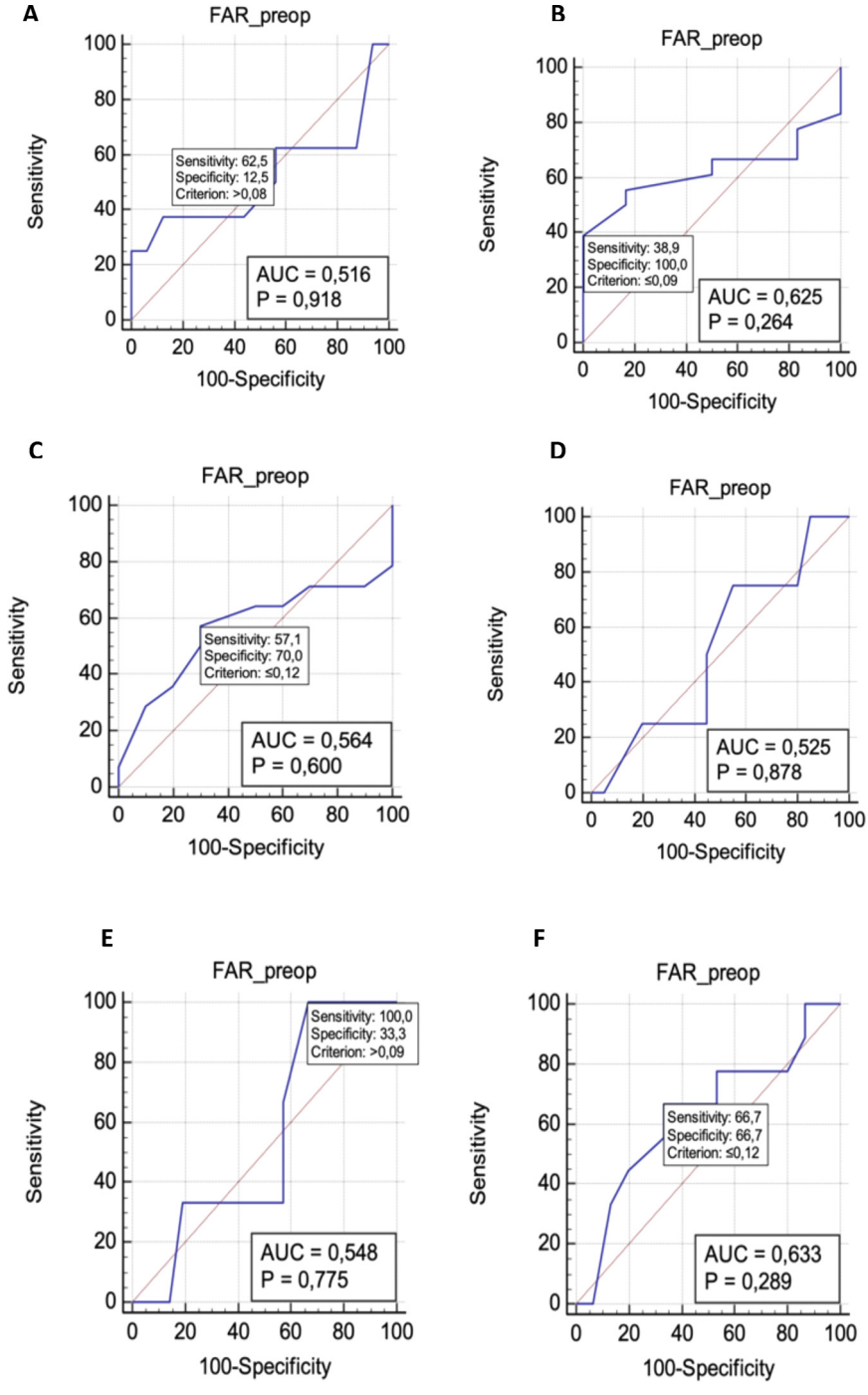
A
FAR_preop
Sensitivity
100-Specificity
Sensitivity: 62,5
Specificity: 12,5
Criterion: >0,08
AUC = 0,516
P = 0,918
B
FAR_preop
Sensitivity
100-Specificity
Sensitivity: 38,9
Specificity: 100,0
Criterion: ≤0,09
AUC = 0,625
P = 0,264
C
FAR_preop
Sensitivity
100-Specificity
Sensitivity: 57,1
Specificity: 70,0
Criterion: ≤0,12
AUC = 0,564
P = 0,600
D
FAR_preop
Sensitivity
100-Specificity
AUC = 0,525
P = 0,878
E
FAR_preop
Sensitivity
100-Specificity
Sensitivity: 100,0
Specificity: 33,3
Criterion: >0,09
AUC = 0,548
P = 0,775
F
FAR_preop
Sensitivity
100-Specificity
Sensitivity: 66,7
Specificity: 66,7
Criterion: ≤0,12
AUC = 0,633
P = 0,289

Fig. 3. xxx.

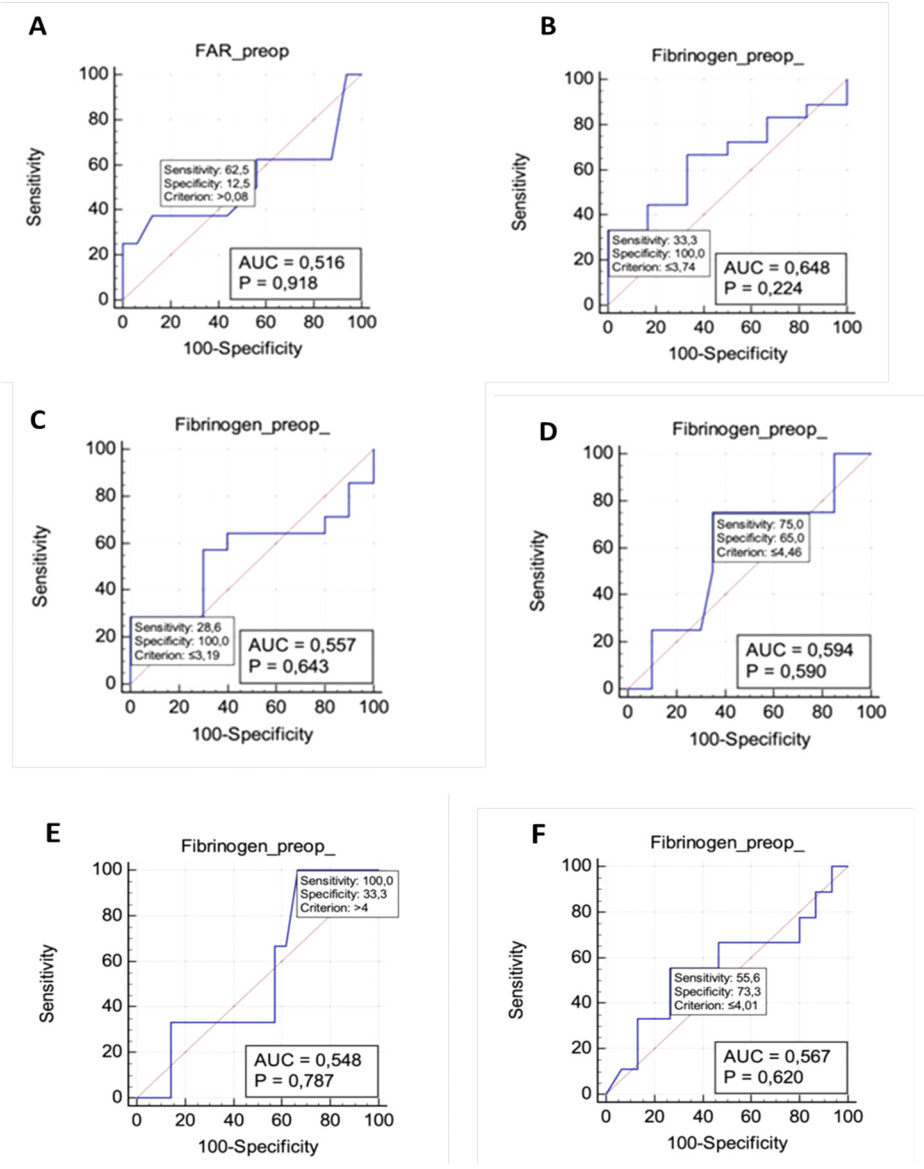

Fig. 4. xxx.

2. Experimental Design, Materials and Methods

2.1. Research issue

Pancreatic surgery is one of the surgeries burdened with the highest mortality and morbidity rate. This is due both to the biological nature of the pathology affecting the organ and

to the technical difficulties associated with surgery. Inflammation has been considered as an important hallmark of cancer [1]. It participates in the development of human cancer and tumor-associated inflammatory factors are closely related to the prognosis in cancer patients [2,3]. Thereof, a series of inflammation-related index systems were reported as useful predictors in a variety of human tumors [4–6]. As novel inflammation-based markers, the combination with fibrinogen and albumin, namely, fibrinogen-albumin ratio (FAR) was proposed. The prognostic power has therefore been analyzed in multiple types of tumors. For example, the patients with high FAR had significantly worse survival than those with low FAR in the breast, esophageal and gastric cancer [7–9]. With regard to pancreatic surgery, similar outcomes have been analyzed founding that high FAR values are associated with a worse prognosis in patients undergoing radical resection for pancreatic adenocarcinoma [10], similarly to what was found by associating the outcomes with the CA-19.9 dosage [11]. There have therefore been many efforts to define surrogate prognostic markers related to pancreatic cancer. However, the potential of these markers in predicting the multiple perioperative complications associated with pancreatic surgery has not yet been investigated. FAR, actually used as prognostic indicator for pancreatic cancer patients, could help to identify patients at increased risk of postoperative complications such as pancreatic fistula (POPF) [12], postoperative hemorrhage and biliary fistula.

The aim of our analysis was to estimate the potential of FAR in predicting the risk of postoperative complications in patients undergoing pancreatic resection.

One hundred and seventeen patients who underwent pancreatic resection between 2007 and 2021 were included; only patients with all available data were enrolled in the analysis.

Pre-operative level of albumin, fibrinogen, CA 19.9 were obtained. FAR has been calculated. Retrospectively, data obtained with postoperative complications in patients undergoing pancreasectomy were related. Specifically, it has been related to complications such as the onset of pancreatic fistula, biliary fistula, post-operative hemorrhage. Receiver Operating Characteristic (ROC) analysis was performed, and Area under the Curve (AUC) was calculated to define the cut-off point for the serum albumin, fibrinogen and FAR and its accuracy in predicting the occurrence of clinically relevant pancreatic fistula, post-operative hemorrhage.

2.2. Patient characteristics

A total of 117 radical pancreatic resections were included in this analysis. Most of these for pancreatic ductal adenocarcinoma (70.1%). In the analysis of perioperative complications, total pancreatic resections were excluded; the final sample therefore counts 81 pancreatectomies of which 23 (19.8%) proximal and 58 (49.8%) distal resections. In the present subgroup, 24 patients developed clinically relevant pancreatic fistula, reported according to the definition of the International Study Group on Pancreatic Surgery (ISGPS), 8 patients developed post-operative bleeding and only 1 patient had surgery site infection.

2.3. Statistical analysis

A statistical analysis was therefore performed by correlating the preoperative values of albumin, fibrinogen and FAR and the incidence of these complications. In the first phase, an analysis was performed considering local laboratory values for serum albumin e fibrinogen level. The ratio between fibrinogen and albumin was therefore acquired. In the second phase of the analysis, Receiver Operating Characteristic (ROC) analysis was performed, and Area under the Curve (AUC) was calculated to define the cut-off point for the serum albumin, fibrinogen and FAR and

its accuracy in predicting the occurrence of clinically relevant pancreatic fistula, post-operative hemorrhage.

Ethics Statements

The study was approved by the Campus Bio-Medico Ethics Committee, Prot. 28/19 OSS ComEt CBM. No informed consent was required and a substitute declaration of informed consent for observational retrospective studies was prepared.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability

Database FAR (Original data) (Mendeley Data).

CRediT Author Statement

V. La Vaccara: Conceptualization, Methodology, Software, Formal analysis, Investigation, Writing – original draft, Project administration; **R. Cammarata:** Software, Investigation, Formal analysis, Writing – review & editing; **A. Coppola:** Conceptualization, Methodology, Software, Formal analysis, Investigation, Writing – original draft, Project administration, Supervision; **T. Farolfi:** Software, Investigation, Formal analysis, Supervision; **C. Cascone:** Software, Investigation, Formal analysis, Writing – review & editing; **S. Angeletti:** Software, Formal analysis, Investigation, Writing – original draft, Supervision; **G. Maltese:** Software, Investigation, Formal analysis, Writing – review & editing; **R. Coppola:** Conceptualization, Methodology, Writing – review & editing, Supervision; **D. Caputo:** Conceptualization, Methodology, Writing – review & editing, Supervision.

Acknowledgments

None.

References

[1] A. Mantovani, P. Allavena, A. Sica, F. Balkwill, Cancer-related inflammation, Nature 454 (2008) 436–444, doi:10.1038/nature07205.
[2] S.I. Grivennikov, F.R. Greten, M. Karin, Immunity, inflammation, and cancer, Cell 140 (2010) 883–899, doi:10.1016/j.cell.2010.01.025.
[3] A. Coppola, V. La Vaccara, L. Caggiati, L. Carbone, S. Spoto, M. Ciccozzi, S. Angeletti, R. Coppola, D. Caputo, Utility of preoperative systemic inflammatory biomarkers in predicting postoperative complications after pancreaticoduodenectomy: literature review and single center experience, World J. Gastrointest. Surg. 13 (10) (2021) 1216–1225 Oct 27PMID: 34754389; PMCID: PMC8554715, doi:10.4240/wjgs.v13.i10.1216.
[4] Y. Zhang, S. Lin, X. Yang, R. Wang, L. Luo, Prognostic value of pretreatment systemic immune-inflammation index in patients with gastrointestinal cancers, J. Cell. Physiol. 234 (2019) 5555–5563, doi:10.1002/jcp.27373.
[5] K. Sun, S. Chen, J. Xu, G. Li, Y. He, The prognostic significance of the prognostic nutritional index in cancer: a systematic review and meta-analysis, J. Cancer Res. Clin. Oncol. 140 (2014) 1537–1549, doi:10.1007/s00432-014-1714-3.
[6] N. Li, G.W. Tian, Y. Wang, H. Zhang, Z.H. Wang, G. Li, Prognostic role of the pretreatment C-reactive protein/albumin ratio in solid cancers: a meta-analysis, Sci. Rep. 7 (2017) 41298, doi:10.1038/srep41298.
[7] K.T. Hwang, J.K. Chung, E.Y. Roh, et al., Prognostic influence of pre- operative fibrinogen to albumin ratio for breast cancer, J. Breast Cancer 20 (2017) 254–263, doi:10.4048/jbc.2017.20.3.254.

[8] Z. Tan, M. Zhang, Q. Han, et al., A novel blood tool of cancer prognosis in esophageal squamous cell carcinoma: the fibrinogen/albumin ratio, J. Cancer 8 (2017) 1025–1029, doi:10.7150/jca.16491.
[9] J. Zhang, S.Q. Li, Z.H. Liao, et al., Prognostic value of a novel FPR biomarker in patients with surgical stage II and III gastric cancer, Oncotarget 8 (2017) 75195–75205, doi:10.18632/oncotarget.20661.
[10] L.P. Zhang, H. Ren, Y.X. Du, C.F. Wang, Prognostic value of the preoperative fibrinogen-to-albumin ratio in pancreatic ductal adenocarcinoma patients undergoing R0 resection, World J. Gastroenterol. 26 (46) (2020) 7382–7404, doi:10.3748/wjg.v26.i46.7382.
[11] A. Coppola, V. La Vaccara, M. Fiore, T. Farolfi, S. Ramella, S. Angeletti, R. Coppola, D. Caputo, CA19.9 serum level predicts lymph-nodes status in resectable pancreatic ductal adenocarcinoma: a retrospective single-center analysis, Front. Oncol. 11 (2021) 690580 May 27PMID: 34123859; PMCID: PMC8190389, doi:10.3389/fonc.2021.690580.
[12] C. Bassi, G. Marchegiani, C. Dervenis, M. Sarr, M. Abu Hilal, M. Adham, P. Allen, R. Andersson, H.J. Asbun, M.G. Besselink, K. Conlon, M. Del Chiaro, M. Falconi, L. Fernandez-Cruz, C. Fernandez-Del Castillo, A. Fingerhut, H. Friess, D.J. Gouma, T. Hackert, J. Izbicki, K.D. Lillemoe, J.P. Neoptolemos, A. Olah, R. Schulick, S.V. Shrikhande, T. Takada, K. Takaori, W. Traverso, C.R. Vollmer, C.L. Wolfgang, C.J. Yeo, R. Salvia, M. Buchler, International Study Group on Pancreatic Surgery (ISGPS), The 2016 update of the International Study Group (ISGPS) definition and grading of postoperative pancreatic fistula: 11 years after, Surgery 161 (2017) 584–591.