

Nagy et al., Discharge protocol in acute pancreatitis: an international survey and cohort analysis

SUPPLEMENTARY MATERIAL

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FIGURE S1. The online questionnaire used in the international survey

Name *

Saját válasz _____

E-mail address *

Saját válasz _____

Center/Institute/Hospital: *

Saját válasz _____

City: *

Saját válasz _____

Country: *

Saját válasz _____

Does your center/institute/hospital have any discharge protocol for AP? *

Yes

No

If yes, please share the details:

Saját válasz _____

Discharge protocol file upload

[Fájl hozzáadása](#)

Do you plan to upload an Excel sheet by 28th February? *

Yes (If you choose this, a password protected link will be sent to you later)

No

Online sheet used for the international survey where the centres were asked to provide information if they apply a discharge protocol and if yes, give its elements.

TABLE S2. Table of the institutions participating in the analysis

	Country	Center	Prot ocol	Patient number	Length of hospitalization		Discharge CRP		1-month readmission rate	
					mean ± SD	median (Q1, Q3)	mean ± SD	median (Q1, Q3)	n	%
1	Bulgaria	Department of Gastroenterology, Queen Yoanna University Hospital, Medical University of Sofia	NO	60	9.23 ± 6.76	7 (4, 11)	84.89 ± 115.59	17.5 (4.65, 137.2)	0	0%
2	Bulgaria	University Hospital, Department of Surgery, Stara Zagora	NO	116	11.47 ± 7.24	9 (7, 14)	68.1 ± 69.8	54.45 (23.45, 86.93)	21	18.10%
3	China	Department of Gastroenterology, Clinical Medical College, Yangzhou University	NO	106	6.75 ± 2.31	6 (5, 8)	39.81 ± 58.86	19.95 (6.55, 48.94)	NA	NA
4	China	Department of Gastroenterology, First Affiliated Hospital of Nanchang University, Nanchang	NO	1096	12.18 ± 13.83	8 (5, 13)	57.01 ± 70.39	25.4 (10.6, 84.45)	109	9.95%
5	China	Department of Gastroenterology, Peking Union Medical College Hospital	NO	306	20.86 ± 16.47	16 (10, 27)	31.7 ± 40.15	15 (5.5, 41.5)	50	16.34%
6	China	West China Hospital, Sichuan University	NO	216	10.31 ± 6.63	9 (6, 13)	57.88 ± 86.2	19.7 (6.86, 78.1)	1	0.46%
7	Croatia	Department of Gastroenterology, Clinical Hospital Center Rijeka, University of Rijeka	NO	202	10.71 ± 8.04	9 (6.25, 12.75)	40.11 ± 53.3	18.2 (8.1, 54.5)	10	4.95%
8	Czech Republic	Centrum péče o zaživací trakt, Vítkovická nemocnice a.s., Ostrava	NO	11	8.18 ± 2.44	8 (6.5, 10)	43.47 ± 52.05	20.1 (9.5, 58.3)	NA	NA
9	Finland	Helsinki University Central Hospital	NO	25	4.08 ± 2.77	3 (3, 4)	101.24 ± 78.77	84 (64, 113)	NA	NA
10	Germany	Department of Medicine II, University Medical Center Mannheim, Heidelberg University, Mannheim	NO	126	7.81 ± 10.9	6 (4, 8)	62.95 ± 62.32	48.3 (14, 93.25)	14	11.11%
11	Germany	Department of Internal Medicine II, LMU Hospital, Munich	NO	295	9.94 ± 11.28	7 (4, 11)	50.87 ± 59.19	28 (12, 69)	24	8.14%
12	Germany	Division of Gastroenterology, University of Leipzig Medical Center	NO	26	15.35 ± 16.84	8 (5, 20.25)	24.73 ± 19.8	19 (9.75, 30.75)	4	15.38%
13	Greece	4th Department of Surgery, School of Medicine, Aristotle University of Thessaloniki	NO	24	12.04 ± 11.31	8 (7, 11.25)	4.3 ± 7.95	1.27 (0.97, 1.89)	3	12.50%
14	Hungary	Békés County Central Hospital, Dr. Réthy Pál Hospital, Békéscsaba	NO	84	16.14 ± 8.68	14 (10, 19)	27.93 ± 33.06	12.96 (5.43, 43.33)	NA	NA
15	Hungary	BAZ Central County Central Hospital	NO	16	13.12 ± 5.9	13 (10.75, 14.5)	56.8 ± 56.28	42 (9.05, 95.46)	NA	NA

16	Hungary	Bajcsy-Zsilinszky Hospital, Budapest	NO	159	13.39 ± 12.56	10 (8, 15)	59.34 ± 62.38	40.7 (10.45, 76.85)	NA	NA
17	Hungary	Dr. Bugyi Istvan Hospital, Szentes	NO	85	10.70 ± 8.43	9 (7, 13)	41.14 ± 71.71	16.50 (7.5, 37.4)	11	12.94%
18	Hungary	Department of Emergency, University of Szeged	NO	10	10.68 ± 8.05	11 (7, 13)	22.92 ± 22.57	13.55 (12.42, 20.45)	2	20.00%
19	Hungary	3rd Int. Medicine/Gastroenterology, Pándy Kálmán Hospital, Gyula	NO	41	10.53 ± 5.85	8.5 (7, 11.5)	49.06 ± 42.83	33 (13.53, 77.01)	NA	NA
20	Hungary	Heim Pál National Pediatric Hospital, Budapest	NO	28	10.17 ± 4.89	11 (7.25, 13)	10.63 ± 12.31	5 (0.9, 18.48)	NA	NA
21	Hungary	Bács-Kiskun County Hospital, Kecskemét	NO	18	14.72 ± 12.98	13 (8.25, 17.5)	54.93 ± 98.41	15.65 (12.16, 29.95)	NA	NA
22	Hungary	Csongrad County Health Center, Makó-Hódmezővásárhely	NO	10	25.1 ± 13.78	21.5 (16.25, 31.25)	10.39 ± 11.3	6.23 (2.74, 15.74)	NA	NA
23	Hungary	1st Department of Pediatrics, Semmelweis University, Budapest	NO	12	16.18 ± 7.49	14 (9.5, 20.5)	0.1 ± 0.14	0.1 (0.05, 0.15)	NA	NA
24	Hungary	Ist Dep. of Internal Medicine, Szeged	NO	367	12.78 ± 21.77	9 (6, 14)	49.55 ± 61.88	29.35 (10.65, 60.25)	NA	NA
25	Hungary	II. Hospital, Szeged	NO	46	11.02 ± 8.38	9 (6.25, 12)	60.19 ± 52.41	59.1 (12.35, 95.5)	NA	NA
26	Hungary	2nd Dep. of Internal Medicine, Szeged	NO	36	12.39 ± 8.98	12 (8.75, 14)	31.88 ± 47.4	12 (5.1, 34.3)	NA	NA
27	Hungary	Markusovszky University Teaching Hospital, Szombathely	NO	29	15.52 ± 8.85	12 (11, 16)	33.36 ± 50.3	14.6 (7.5, 40.9)	NA	NA
28	Hungary	University of Debrecen	YES	8	8.88 ± 3.44	9.5 (7.25, 11.25)	42.73 ± 58.14	23 (15.51, 40.38)	NA	NA
29	Hungary	Saint George University Teaching Hospital of County-Fejér	YES	140	7.76 ± 4.39	6.5 (5, 9)	52.62 ± 46.5	39.25 (13.6, 83.93)	5	3.57%
30	Hungary	University of Pécs	YES	540	8.31 ± 8.4	6 (5, 8)	47.28 ± 46.19	35.2 (13.88, 64.5)	30	5.56%
31	India	Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh	NO	145	21.57 ± 17.35	15 (9, 30)	NaN ± NA	NA (NA, NA)	12	8.28%
32	Italy	Department of Gastroenterology , The Pancreas Institute, G.B. Rossi University Hospital, Verona	NO	82	35.17 ± 59.44	16.5 (9.25, 40.75)	35.32 ± 45.83	16 (6.75, 40.75)	3	3.66%

33	Italy	Department of Surgery, AOU Sant'Orsola Malpighi, IRCCS Azienda Ospedaliera Universitaria, Bologna	NO	111	11.93 ± 16.6	9 (6, 13)	50.34 ± 58.12	25.15 (9.4, 92)	10	9.01%
34	Italy	General Surgery Dpt., Azienda Ospedaliera Ospedali Riuniti Villa Sofia-Cervello, Palermo	NO	35	6.74 ± 1.36	7 (6, 8)	2.51 ± 2.06	1.7 (1.5, 2.2)	5	14.29%
35	Italy	S. Orsola-Malpighi Hospital, University of Bologna	NO	202	11.82 ± 10.79	9 (6, 14)	41.3 ± 57.58	17.25 (6.57, 54.52)	22	10.89%
36	Lithuania	Lithuanian University of Health Sciences, Kaunas	NO	324	15.73 ± 16.83	11 (7, 17)	51.15 ± 81.28	19 (8, 48)	13	4.01%
37	Lithuania	Vilnius, Vilnius University Hospital Santariskiu Klinikos (Santariskiu Klinikos)	NO	31	10.61 ± 4.02	10 (8, 12)	24 ± 27.4	13.05 (9.85, 28.38)	NA	NA
38	Poland	Collegium Medicum, The Jan Kochanowski University in Kielce	NO	260	7.52 ± 7.74	5 (5, 7)	119.37 ± 107.16	79.21 (28.4, 193.97)	12	4.62%
39	Poland	Department of Gastroenterology, Medical University of Lodz	NO	105	9.55 ± 4.35	9 (7, 11)	61.56 ± 81.93	21.2 (5.8, 95.3)	7	6.67%
40	Poland	Department of Gastrointestinal Surgery, Medical University of Silesia ,Katowice	NO	32	32.84 ± 23.15	29 (17.25, 40)	112.79 ± 116.03	105.1 (56.1, 139)	3	9.38%
41	Poland	Medical University of Lodz	NO	330	10.9 ± 6.65	9 (7, 13)	39.24 ± 41.19	22 (10.7, 56.5)	12	3.64%
42	Portugal	Gastroenterology Department, Hospital da Senhora da Oliveira - Guimarães	NO	301	9.64 ± 13.1	6 (5, 10)	46.06 ± 58.88	25.2 (7.7, 63.9)	37	12.29%
43	Portugal	Hospital Prof. Fernando Fonseca, Amadora	NO	541	11.31 ± 13.64	7.58 (4.72, 12.31)	49.06 ± 67.92	24.85 (8.87, 58.3)	51	9.43%
44	Portugal	Unidade HBP, Serviço de Cirurgia Geral, Centro Hospitalar Tondela-Viseu, Viseu	NO	201	10.43 ± 15.58	8 (5, 11)	53.87 ± 71.46	31.25 (13.4, 57.33)	13	6.47%
45	Romania	"Octavin Fodor" Institute of Gastroenterology and Hepatology, Cluj Napoca	YES	491	8.45 ± 6.84	7 (5, 10)	57.21 ± 60.93	32.85 (8.35, 87.08)	54	11.00%
46	Romania	2nd Department of Internal Medicine, Discipline of Diabetes, Nutrition and Metabolic Diseases "Victor Babes" University of Medicine and Pharmacy, Timisoara	YES	228	6.85 ± 4.15	6 (4, 9)	24.05 ± NA	24.05 (24.05, 24.05)	10	4.41%
47	Romania	Carol Davila University of Medicine and Pharmacy Bucharest, Emergency Hospital of Bucharest	NO	202	10.32 ± 12.37	6 (4, 11)	130.4 ± 146.88	66 (30, 185)	27	13.37%
48	Romania	Central Military Emergency Hospital Dr. Carol Davila	NO	310	9.1 ± 7.11	7 (5, 11)	72.63 ± 81.66	32.76 (12.4, 112.57)	57	18.39%
49	Romania	Clinical Emergency Hospital, Bucharest	NO	122	6.59 ± 5.84	5 (4, 7.75)	71.78 ± 69.74	42.5 (18.5, 115)	2	1.64%

50	Romania	Clinical Institute Fundeni, Bucharest	NO	130	13.75 ± 9.57	10 (8, 16)	43.46 ± 48.58	28.6 (14, 48.8)	70	53.85%
51	Romania	Gastroenterology Department, Colentina Clinical Hospital	NO	126	7.73 ± 5.04	6 (5, 9)	45.83 ± 55.58	23 (12.12, 55)	6	4.76%
52	Romania	Maros Megyei Sürgősségi Kórház, Targu Mures	NO	52	8.38 ± 4.08	7 (6, 10)	NaN ± NA	NA (NA, NA)	0	0%
53	Romania	Faculty of Medicine, Ovidius University of Constanta, Romania	NO	221	7.79 ± 4.80	7 (5, 10)	8.06 ± 10.04	4.15 (1.64, 10.75)	15	6.78
54	Russia	Department of Surgical Disciplines, Immanuel Kant Baltic Federal University, Regional Clinical Hospital, Kaliningrad	NO	94	8.64 ± 4.64	8 (6, 11)	59.75 ± 11.84	56 (54.5, 61.25)	8	8.51%
55	Russia	Sechenov University, Moscow	NO	17	20.53 ± 13.86	21 (10, 25)	4.17 ± 4.37	3 (1.75, 6)	4	23.53%
56	Russia	Omsk State Medical University	NO	1572	10.52 ± 2.62	11 (9, 12)	36.6 ± 17.4	34 (24, 47)	110	7.00%
57	Russia	Sklifosovsky Institute for Clinical Medicine, Sechenov University, Moscow	NO	20	12.35 ± 8.05	12 (8, 13)	89.3 ± 60.72	66.85 (61.15, 95)	4	20.00%
58	Russia	Saint Luke Clinical Hospital, St. Petersburg	NO	28	14.07 ± 15.1	11 (8.75, 15)	NaN ± NA	NA (NA, NA)	NA	NA
59	Serbia	Department for Hepatobiliary and Pancreatic Surgery, Clinic for General Surgery, Military Medical Academy, University of Defense, Belgrade	YES	99	13.9 ± 11.03	10 (7, 17)	56.37 ± 85.93	22.88 (13.98, 45.88)	10	10.10%
60	Slovakia	1st Department of Surgery UNLP, Kosice	YES	411	11.31 ± 10.93	9 (6.5, 13)	50.37 ± 59.13	28.56 (10.62, 72.92)	29	7.06%
61	Slovakia	Hepatology and Gastroenterology departement of Roosvelt Hospital, Banska Bystrica	NO	25	8.52 ± 6.72	6 (4, 10)	84.35 ± 90.4	57.63 (21.19, 117.21)	2	8.00%
62	Slovakia	University hospital in Martin, Jessenius medical faculty Commenius University, Bratislava	NO	74	10.05 ± 7.22	8 (6, 12)	31.24 ± 41.9	13.15 (6.55, 40.15)	9	12.16%
63	South Korea	Department of Internal Medicine, Jeju National University College of Medicine, Jeju	YES	80	6.06 ± 2.4	6 (4, 7)	64.29 ± 68.02	58.4 (12.65, 77.5)	2	2.50%
64	South Korea	Gachon University, Incheon	NO	441	8.45 ± 10.64	6 (4, 9)	17.3 ± 28.39	5.81 (1.54, 19.66)	59	13.38%
65	Spain	Gastroenterology Department, University Hospital of Santiago de Compostela	NO	258	6.71 ± 7.82	5 (3, 7)	61.79 ± 66.74	36.8 (13.02, 95.16)	16	6.20%
66	Spain	Hospital Vall d'hebron, Barcelona	NO	454	16.35 ± 22.03	10 (6, 17)	6.73 ± 8.56	3.15 (0.98, 9.28)	57	12.56%

67	Spain	Sant Pere de Ribes, General Surgery, Consorci Sanitari del Garrof	NO	27	6.22 ± 3.14	5 (4.5, 7.5)	66.78 ± 87.39	16 (1.8, 158.3)	NA	NA
68	Spain	Servicio de Aparato Digestivo Hospital Clínico Universitario Valladolid	NO	438	9.37 ± 13.91	6 (4, 9)	70.55 ± 75.36	43.4 (15.25, 104)	24	5.48%
69	Spain	University Hospital Arnau de Vilanova - University Hospital Santa María	NO	267	7.8 ± 6.71	5 (4, 9)	82.15 ± 82.09	51.8 (21.2, 115.9)	35	13.11%
70	Tunisia	Habib Bourguiba University Hospital, Sfax	NO	59	12.37 ± 7.59	12 (7, 15.5)	32.01 ± 51.9	11.5 (4.6, 18.4)	2	3.39%
71	Tunisia	Mohamed Ben Sassi Hospital, Gabes	NO	41	9.95 ± 8.97	8 (6, 10)	19.9 ± 44.12	8 (5, 15)	5	12.20%
72	Turkey	Department of Gastroenterology, Sakarya University Faculty of Medicine, Sakarya	NO	275	4.83 ± 3.68	4 (3, 6)	66.29 ± 61.78	50 (17.7, 100)	36	13.09%
73	Turkey	Hospital of Bezmialem Vakif University, School of Medicine, Istanbul	NO	20	3.85 ± 1.18	3 (3, 5)	37.9 ± 62.62	19.57 (11.57, 27.91)	NA	NA
74	Turkey	İzmir Katip Çelebi University Atatürk Training and Research Hospital	NO	200	10.87 ± 10.88	8 (5, 14)	56.35 ± 54.57	41.7 (16.85, 85.7)	39	19.50%
75	Turkey	Marmara University Education and Training Hospital, Istanbul	YES	243	6.88 ± 7.83	5 (4, 7)	44.16 ± 47.63	22.6 (8.59, 69.6)	46	18.93%
76	Turkey	Dep. of Gastroenterology, Mersin University	YES	202	5.48 ± 3.88	4 (3, 6.75)	63.35 ± 67.39	32 (9, 104)	16	7.92%
77	Ukraine	1st Department of General Surgery, Bogomolets National Medical University, Kyiv	NO	198	36.9 ± 22.06	35 (18, 51)	36.98 ± 55.48	23.15 (16.5, 32.2)	30	15.15%
78	Ukraine	Dep. of Surgery with a Course of Emergency and Vascular Surgery at Bogomolets National Medical University, Kyiv	NO	329	15.02 ± 18.17	10 (8, 15)	59.36 ± 12.33	59 (53, 67)	9	2.74%
79	Ukraine	Lviv Regional Clinical Hospital	NO	133	15.68 ± 11.74	14 (9, 17)	62.91 ± 98.18	35.2 (17.35, 67.25)	6	4.51%
80	United Kingdom	Liverpool University Hospitals NHS Foundation Trust	NO	733	12.54 ± 21.19	7 (4, 12.25)	47.46 ± 59.53	25 (8, 62)	33	4.50%

List of the centres and their relevant clinical parameters which participated either in the international survey or national cohort analysis. Length of hospitalization is expressed in days, while the discharge CRP value in mg/l.

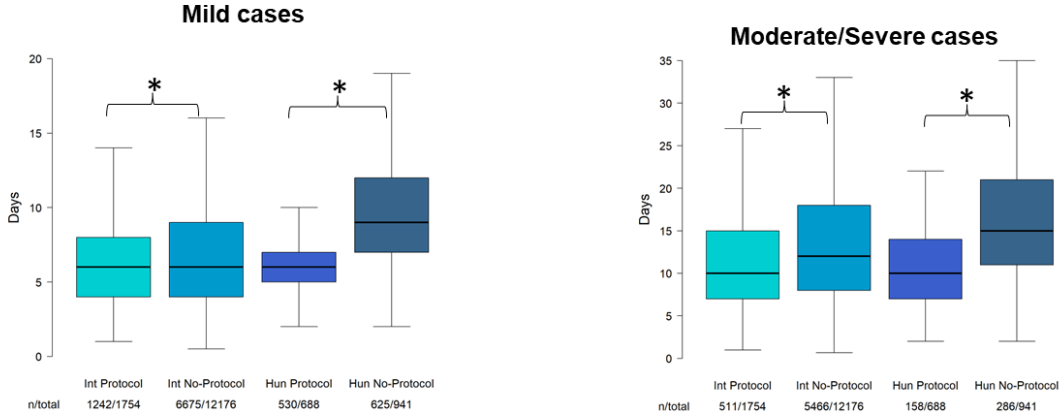
TABLE S3. Table of reported discharge protocols

Centres	oral feeding	inflammatory markers	pancreatic enzymes	abdominal status	appetite	fever
"Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania	x	✓	✓	✓	x	x
University of Louis Pasteur, Kosice, Slovak Republic	x	✓	✓	✓	x	x
Mersin University, Faculty of Medicine, Turkey	✓	✓	x	✓	x	x
Jeju National University College of Medicine, Jeju, South Korea	✓	x	x	✓	✓	✓
Military Medical Academy, University of Defense, Belgrade, Serbia	✓	✓	✓	✓	x	x
"Octavin Fodor" Institute of Gastroenterology and Hepatology, Cluj Napoca, Romania	✓	✓	✓	✓	x	✓
Marmara University Education and Training Hospital, Istanbul, Turkey	✓	✓	x	✓	x	x
	✓ part of the protocol, X not mentioned in the protocol					

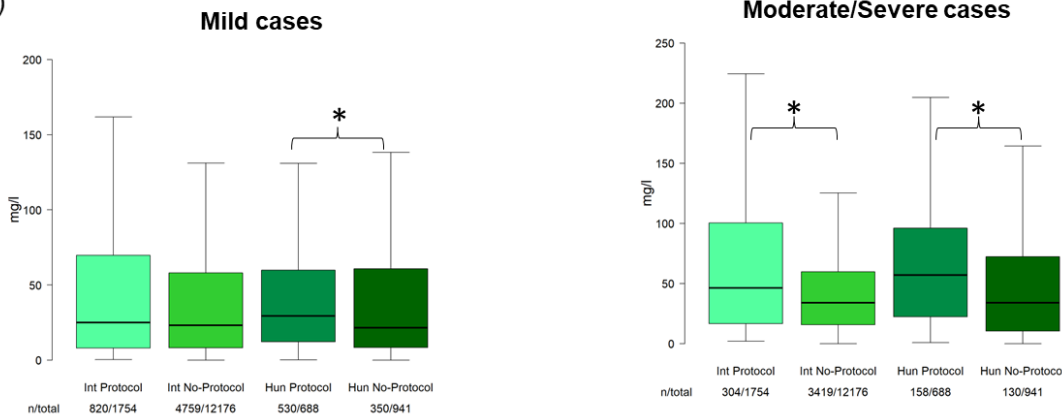
This table describes the main elements of the reported discharge protocols in the international survey. While the abdominal status was mentioned in all case, the assessment of appetite or fever were hardly mentioned-.

FIGURE S2. Length of hospitalisation and discharge CRP values based on severity visualized by boxplots

a. Length of hospitalization

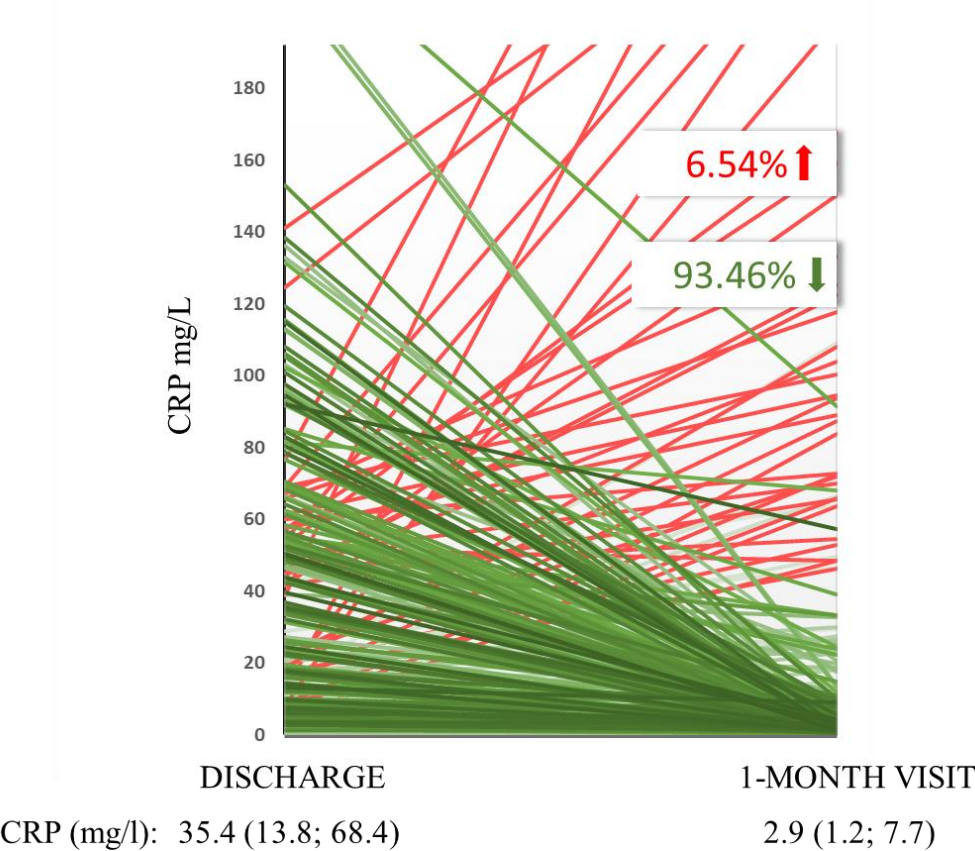


b. Discharge CRP (mg/l)



There is a significantly shorter LOH and higher discharge CRP in centres with protocolized discharge approach. *p<0.05

FIGURE S3. Line chart showing the change of CRP level after discharge until 1-month visit



93.46% of the patients presented with a clearly decreasing CRP level at the 1-month follow-up visit compared. Those with elevated CRP level were investigated further.

TABLE S4. Data quality

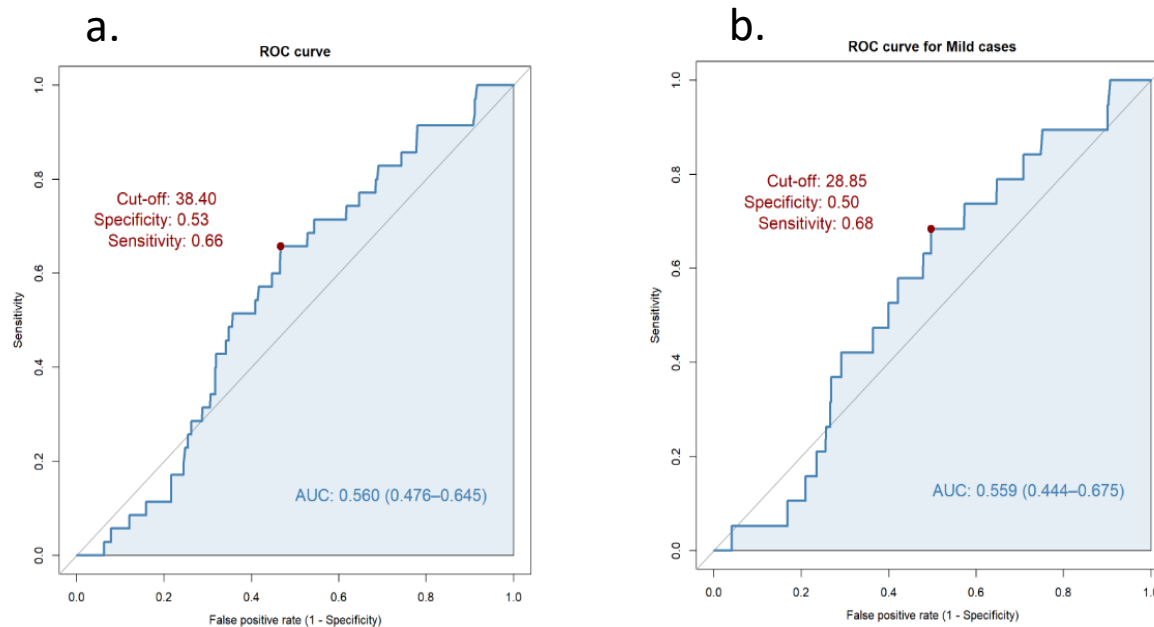
International cohort

	N	Reported data	%
Age	688	688	100
Gender	688	688	100
Severity	688	688	100
Length of hospitalization	688	688	100
Etiology	688	688	100
Maximum CRP	688	688	100
Discharge CRP	688	688	100
1-month CRP	688	688	100
Readmission	688	688	100
Etiology of readmission	35	35	100
Total	6227	6227	100

Hungarian cohort

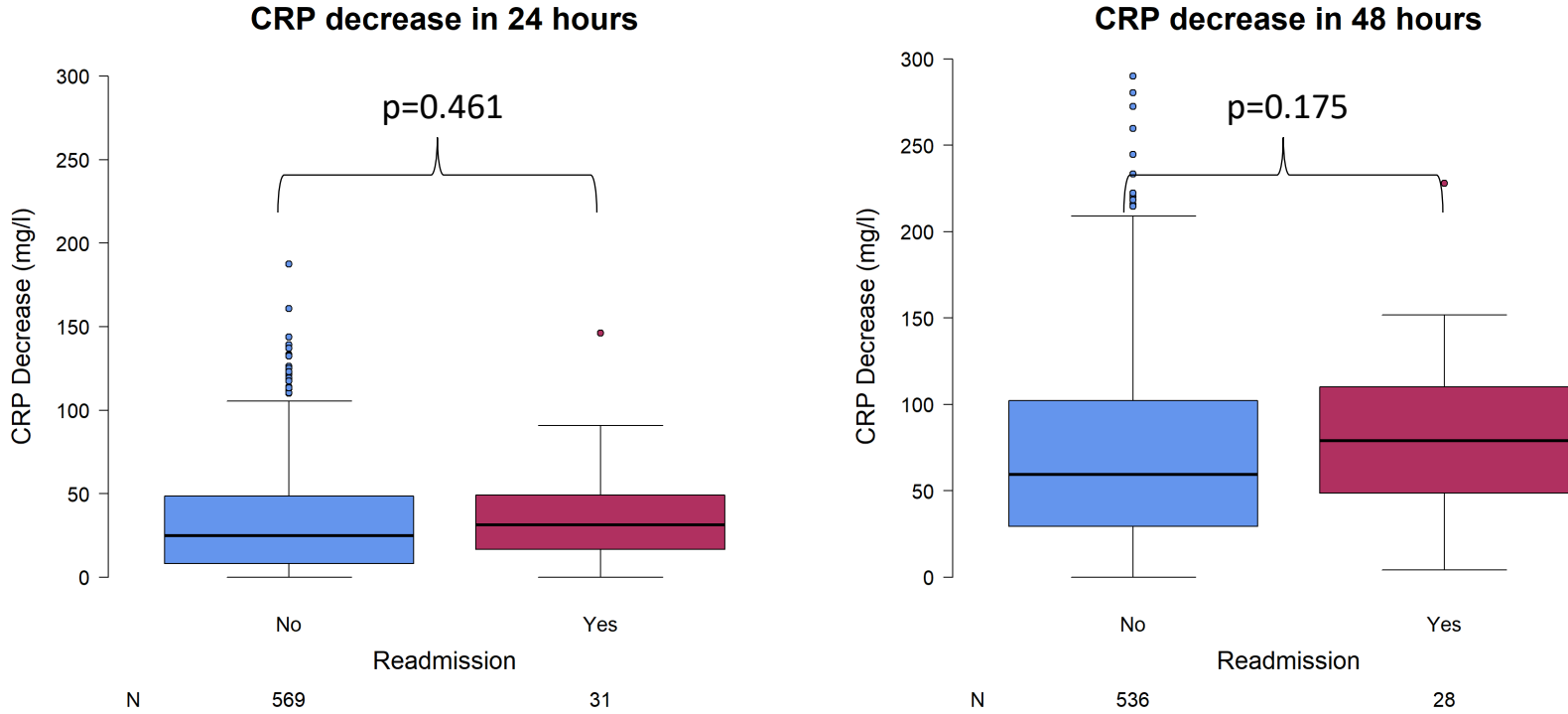
	N	Reported data	%
Age	14650	14644	99
Gender	14650	14649	99
Severity	14650	14628	99
Length of hospitalization	14650	14599	99
Etiology	14650	14636	99
In-hospital mortality	14650	14483	98
Discharge CRP	14650	9598	65
Readmission	14650	13948	95
Etiology of readmission	1379	1195	94
Total	119459	113370	94

FIGURE S4. ROC curve and AUC value representing the sensitivity and specificity of discharge CRP level in terms of readmission in all (a.) and only in mild AP cases (b.).



The AUC value of 0.560 and 0.559 in the total and only in the mild cases represent a close-to-random state, thus we cannot say with certainty that discharge CRP can predict the readmissions.

FIGURE S5. Relationship of 24 and 48 hours decreasing tendency in CRP and readmission rates



There is no association between the volume of CRP value decrease and the risk of 1-month readmission.