Original Article

Open Access

The Impact of Diabetes Mellitus and Metformin Treatment on Survival of Patients with Advanced Pancreatic Cancer Undergoing Chemotherapy

Younak Choi, MD¹, Tae-Yong Kim, MD^{1,2}, Do-Youn Oh, MD, PhD^{1,2}, Kyung-Hun Lee, MD^{1,2}, Sae-Won Han, MD, PhD^{1,2}, Seock-Ah Im, MD, PhD^{1,2}, Tae-You Kim, MD, PhD^{1,2}, Yung-Jue Bang, MD, PhD^{1,2}

¹Department of Internal Medicine, Seoul National University Hospital, Seoul, ²Cancer Research Institute, Seoul National University College of Medicine, Seoul, Korea

Supplementary Data

Table of Contents

Supplementary Table 1	2
Supplementary Table 2	3
Supplementary Table 3	4

Supplementary Table 1. Clinical characteristics of DM subsets

Characteristic		DM status (n=183)			p-value ^{a)}
		Remote-onset (n= 87)	Recent-onset (n=73)	Subsequent (n= 23)	
Sex	Male	57 (65.5)	44 (60.3)	13 (56.5)	0.658
	Female	30 (34.5)	29 (39.7)	10 (43.5)	
Age (yr)	≥ 60	55 (63.2)	39 (53.4)	15 (65.2)	0.381
	< 60	32 (36.8)	34 (46.6)	8 (34.8)	
ECOG PS	0-1	69 (79.3)	58 (79.5)	20 (87.0)	0.694
	≥ 2	18 (20.7)	15 (20.5)	3 (13.0)	
Cancer extent	LAPC	18 (20.7)	16 (21.9)	3 (13.0)	0.645
	MPC	69 (79.3)	57 (78.1)	20 (87.0)	
Initial BMI (kg/m ²)	< 22.5	52 (60.5)	43 (58.9)	16 (69.6)	0.153
	22.5-24.9	26 (30.2)	15 (20.5)	3 (13.0)	
	≥ 25.0	8 (9.3)	15 (20.5)	4 (17.4)	
Weight loss, initial by BMI ≥ 1 kg/m ²	Yes	56 (64.4)	39 (53.4)	15 (65.2)	0.322
	No	31 (35.6)	34 (46.6)	8 (34.8)	
Weight loss, during first-line, by BMI ≥ 1 kg/m ²	Yes	22 (31.4)	21 (32.8)	8 (40.0)	0.771
	No	48 (68.6)	43 (67.2)	12 (60.0)	
Antidiabetic medication	Yes	72 (82.8)	51 (69.9)	11 (47.8)	0.002
	No	15 (17.2)	22 (30.1)	12 (52.2)	
Metformin	Yes	28 (32.2)	25 (34.2)	3 (13.0)	0.142
	No	59 (67.8)	48 (65.8)	20 (87.0)	
Sulfonylurea	Yes	30 (34.5)	27 (37.0)	5 (21.7)	0.398
	No	57 (65.5)	46 (63.0)	18 (78.3)	
Insulin	Yes	30 (34.5)	13 (17.8)	0	0.001
	No	57 (65.5)	60 (82.2)	23 (100)	
CA19-9	Elevated	71 (81.6)	63 (86.3)	15 (65.2)	0.076
	Normal	16 (18.4)	10 (13.7)	8 (34.8)	
Albumin	Decreased	20 (23.0)	21 (28.8)	5 (21.7)	0.649
	Normal	67 (77.0)	52 (71.2)	18 (78.3)	
Response	Controlled	51 (58.6)	43 (58.9)	14 (60.9)	0.981
	Uncontrolled	36 (41.4)	30 (41.1)	9 (39.1)	
Courses of chemotherapy	1	41 (47.1)	35 (47.9)	14 (60.9)	0.485
	≥ 2	46 (52.9)	38 (52.1)	9 (39.1)	

Values are presented as number (%). DM, diabetes mellitus; ECOG PS, Eastern Cooperative Oncology Group performance status; LAPC, locally advanced pancreatic cancer; MPC, metastatic pancreatic cancer; BMI, body mass index. ^{a)}Fisher exact test.

Supplementary Table 2. Clinical characteristics of DM patients, with/ without metformin use

Characteristic		Metformin vs. No metformin (n=183)		p-value ^{a)}
		With metformin (n=56)	Without metformin (n=127)	
Sex	Male	32 (57.1)	82 (64.6)	0.408
	Female	24 (42.9)	45 (35.4)	
Age (yr)	≥ 60	39 (69.6)	70 (55.1)	0.074
	< 60	17 (30.4)	57 (44.9)	
ECOG PS	0-1	48 (85.7)	99 (78.0)	0.237
	≥ 2	8 (14.3)	28 (22.0)	
Cancer extent	LAPC	14 (25.0)	23 (18.1)	0.320
	MPC	42 (75.0)	104 (81.9)	
Initial BMI (kg/m ²)	< 22.5	31 (55.4)	80 (63.5)	0.253
	22.5-24.9	18 (32.1)	26 (20.6)	
	≥ 25.0	7 (12.5)	20 (15.9)	
Weight loss, initial by BMI ≥ 1 kg/m ²	Yes	34 (60.7)	76 (59.8)	> 0.999
	No	22 (39.3)	51 (40.2)	
Weight loss, during first-line, by BMI ≥ 1 kg/m ²	Yes	14 (30.4)	37 (34.3)	0.711
	No	32 (69.6)	71 (65.7)	
Sulfonylurea	Yes	29 (51.8)	33 (26.0)	0.001
	No	27 (48.2)	94 (74.0)	
Insulin	Yes	6 (10.7)	37 (29.1)	0.008
	No	50 (89.3)	90 (70.9)	
CA19-9	Elevated	45 (80.4)	104 (81.9)	0.838
	Normal	11 (19.6)	23 (18.1)	
Albumin	Decreased	13 (23.2)	33 (26.0)	0.717
	Normal	43 (76.8)	94 (74.0)	
Response	Controlled	36 (64.3)	72 (56.7)	0.415
	Uncontrolled	20 (35.7)	55 (43.3)	
Courses of chemotherapy	1	28 (50.0)	62 (48.8)	> 0.999
	≥ 2	28 (50.0)	65 (51.2)	

Values are presented as number (%). DM, diabetes mellitus; ECOG PS, Eastern Cooperative Oncology Group performance status; LAPC, locally advanced pancreatic cancer; MPC, metastatic pancreatic cancer; BMI, body mass index; CA19-9, cancer antigen. ^{a)}Fisher exact test.

Supplementary Table 3. Metformin recipients vs. all other patients

Characteristic		Metformin vs. All others (n=349)		p-value ^{a)}
		Metformin (n=56)	All others (n=293)	
Sex	Male	32 (57.1)	192 (65.5)	0.287
	Female	24 (42.9)	101 (34.5)	
Age (yr)	≥ 60	39 (69.6)	133 (45.4)	0.001
	< 60	17 (30.4)	160 (54.6)	
ECOG PS	0-1	48 (85.7)	233 (79.5)	0.358
	≥ 2	8 (14.3)	60 (20.5)	
Cancer extent	LAPC	14 (25.0)	52 (17.7)	0.263
	MPC	42 (75.0)	241 (82.3)	
Initial BMI (kg/m ²)	< 22.5	31 (55.4)	183 (63.3)	0.476
	22.5-24.9	18 (32.1)	71 (24.6)	
	≥ 25.0	7 (12.5)	35 (12.1)	
Weight loss, initial by BMI ≥ 1 kg/m ²	Yes	34 (60.7)	159 (54.3)	0.384
	No	22 (39.3)	134 (45.7)	
Weight loss, during first-line, by BMI ≥ 1 kg/m ²	Yes	14 (30.4)	82 (33.6)	0.735
	No	32 (69.6)	162 (66.4)	
CA19-9	Elevated	45 (80.4)	237 (80.9)	> 0.999
	Normal	11 (19.6)	56 (19.1)	
Albumin	Decreased	13 (23.2)	69 (23.5)	> 0.999
	Normal	43 (76.8)	224 (76.5)	
Response	Controlled	36 (64.3)	161 (54.9)	0.240
	Uncontrolled	20 (35.7)	132 (45.1)	
Courses of chemotherapy	1	28 (50.0)	157 (53.6)	0.663
	≥ 2	28 (50.0)	136 (46.4)	

Values are presented as number (%). ECOG PS, Eastern Cooperative Oncology Group Performance Status; LAPC, locally advanced pancreatic cancer; MPC, metastatic pancreatic cancer; BMI, body mass index; CA19-9, cancer antigen. ^{a)}Fisher exact test.