Age and Surgical Outcomes in Robotic Distal Pancreatectomy: Does Age Really Matter?

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BACKGROUND

Robotic distal pancreatectomy(DP) is emerging as the technique of choice in minimally invasive DP. However, the impact of age on postoperative outcomes remains insufficiently defined. We aim to evaluate the postoperative outcomes of Robotic DP in the different age groups.

METHODS

All patients who underwent primary robotic DP at our institution between 2008 and 2023 were identified, and their medical records were reviewed. Patients were divided into groups based on age by decades of life: 39 years or less, 40-49, 50-59, 60-69, 70-79, and 80 and above. Comorbidities in all age groups were identified and postoperative complications were compared between age groups.

Table 1. Demographics

Variables N=228	< 40 years %(n) - Mean	40s %(n) - Mean	50s %(n) - Mean	60s %(n) - Mean	70s %(n) - Mean	≥ 80 %(n) - Mean
Population	13.59(31)	11.4(26)	18.85(43)	25.87(59)	23.68(54)	6.14(14)
Female	64.51(20)	61.54(16)	60.46(26)	57.62(34)	48.14(26)	50.00(7)
BMI	29.35	30.16	27.70	28.77	28.18	27.07
Smoking						
Active	22.58(7)	23.07(6)	18.60(8)	10.17(6)	7.40(4)	0(0)
Former	19.35(6)	15.38(4)	30.23(13)	27.18(16)	31.48(17)	57.14(8)
Never	58.06(18)	61.54(16)	51.16(22)	62.71(37)	61.11(33)	42.85(6)
Alcohol	19.35(6)	15.38(4)	13.95(6)	5.08(3)	9.25(5)	2.85(4)
Comorbidities						
CHF	0(0)	11.53(3)	6.97(3)	3.38(2)	3.70(2)	2.85(4)
CAD	0(0)	7.69(2)	20.93(9)	18.64(11)	24.07(13)	2.14(3)
HTN	25.80(8)	23.07(6)	51.16(22)	40.67(24)	50.00(27)	50.00(7)
HLD	25.80(8)	30.77(8)	58.13(25)	71.18(42)	64.81(35)	71.42(10)
DM	29.03(9)	42.30(11)	51.16(22)	50.84(30)	51.85(28)	42.85(6)
MI	0(0)	7.69(2)	9.30(4)	11.86(7)	5.56(3)	7.14(1)
CKD	0(0)	11.53(3)	6.97(3)	8.47(5)	22.22(12)	0(0)
COPD	0(0)	11.53(3)	16.27(7)	11.86(7)	12.96(7)	7.14(1)

BMI, Body Mass Index; CHF, Chronic Heart Failure; CAD, Coronary Artery Disease; HTN, Hypertension; HLD, Hyperlipidemia; DM, Diabetes Mellitus; MI, Myocardial Infarction; CKD, Chronic Kidney Disease; COPD, Chronic Obstructive Pulmonary Disease.

RESULTS

A total of 227 patients were identified, 129(56%) were female. There were 31(13.59%) patients age less than 39 years, 26(11.4%) between 40-49, 43(18.85%) between 50-59, 59(25.87%) between 60-69, 54(23.68%) between 70-79, and 14(6.14%) 80 and above Mean age was 59 years of age. Overall, patients aged 80 and older had a higher prevalence of cardiac comorbidities (CHF 28% vs.5%, p<0.001; Cardiac Valve Disease 42% vs.2.3%, p<0.001). In Contrast, patients aged ≤39 years had a higher prevalence of drug abuse (16% Vs.2%, p<0.001) and history of pancreatitis (45% Vs.14%, p<0.001). Patients aged 80 years and older had a higher rate of postoperative pulmonary embolism (7% Vs.0.9%, p=0.49) and chest pain without myocardial infarction (7% Vs.0.4%,p=0.01) as compared to other age groups. Additionally, patients aged 70-79 had higher rates of postoperative fever(2% Vs.1%,p=0.04) and pancreatic fistula (14% Vs.6%,p=0.05). Interestingly, patients in their 50s had longer operative time(OT) (mean 275min Vs.246min,p=0.015) and the highest rate of pancreatic leak (34% Vs.19%,p=0.024) although no significant increase in estimated blood loss(EBL)(mean 276.74 Vs.368.86,p=0.13), length of stay(LOS)(5.35d Vs. 5.64d, p=0.15), reoperation(2% Vs.2%,p=0.75) or 90-day readmission rate(44% vs32%,p=1.51) was observed as a result, when compared to the other age groups.

CONCLUSION

Despite age and higher prevalence of preoperative comorbidities, patients aged 70 and above have overall similar short-term outcomes with no statistically significant increase in OT, EBL, reoperation, LOS, 90-day readmission, or 30-day mortality suggesting age alone should not be a reason to forego robotic DP in otherwise acceptable risk patients. Further studies are required to understand the rationale behind it better.

Table 2. Outcomes

Variables N=228	< 30 years %(n) - Mean	40s %(n) - Mean	50s %(n) - Mean	60s %(n) - Mean	70s %(n) - Mean	≥ 80 %(n) - Mean
Population	13.59(31)	11.4(26)	18.85(43)	25.87(59)	23.68(54)	6.14(14)
LOS	5.26d	7.19d	5.35d	5.49d	5.46d	5.00d
EBL	396.45mL	496mL	276.74mL	306.43mL	404.25mL	196.50
OT	238.88min	245.49min	274.88min	252.07mL	249.65mL	218.63
Abscess	11.53(3)	0(0)	4.65(2)	1.69(1)	5.56(3)	0(0)
Anemia	9.68(3)	3.85(1)	0(0)	3.39(2)	1.85(1)	0(0)
Bleeding	3.22(1)	3.85(1)	2.32(1)	3.39(2)	3.70(2)	7.14(1)
Arrhythmia	6.45(2)	0(0)	2.32(1)	5.08(3)	3.70(2)	0(0)
Chest pain	0(0)	0(0)	2.32(1)	1.69(1)	0(0)	7.14(1)
DVT	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
PE	0(0)	0(0)	2.32(1)	0(0)	0(0)	7.14(1)
DGE	0(0)	3.85(1)	0(0)	0(0)	0(0)	0(0)
Vomiting	16.12(5)	23.08(6)	11.62(5)	8.47(5)	7.40(4)	0(0)
Nausea	32.25(10)	26.92(7)	20.93(9)	18.64(11)	12.96(7)	7.14(1)
Fever	16.12(5)	3.85(1)	16.27(7)	6.78(4)	1.85(1)	0(0)
Hypotension	3.22(1)	3.85(1)	2.32(1)	3.39(2)	0(0)	0(0)
Urinary retention	3.22(1)	0(0)	2.32(1)	3.39(2)	7.40(4)	0(0)
Renal Failure	0(0)	0(0)	0 (0)	0(0)	0(0)	0(0)
Pancreatic Fistula	3.22(1)	7.69(2)	9.30(4)	5.08(3)	14.81(8)	7.14(1)
Sepsis	0(0)	0(0)	0(0)	0(0)	3.70(2)	7.14(1)
Reoperation	0(0)	3.85(1)	2.32(1)	1.69(1)	0(0)	7.14(1)

LOS, Length of Stay; EBL, Estimated Blood Loss; OT, Operative Time; DVT, Deep Venous Thrombosis; PE, Pulmonary embolism; DGE, Delayed Gastric Emptying.

