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Supplementary Figure 1 Comparison of absolute standardized mean difference before and after matching cohorts. The X-axis represents the SMD before and after matching across all potential confounders between drain types. The dashed line represents the 0.10 standardized mean difference (SMD), which is considered a threshold to determine the matching balance across covariates. The small triangle located to the right of the threshold represents the difference between the passive gravity (PG) and negative pressure irrigation (NPI) groups before matching. All black dots located to the left of the threshold indicate minimal differences between the PG and NPI groups after matching and thus confirm successful matching of covariates. ISS: injury severity score; AIS: abbreviated injury scale; BMI: body mass index.

Supplementary Table 1 Definitions of outcomes

Outcomes	Definition
Organ failure	Combination of circulatory, respiratory, or renal failure.
Circulatory failure	Systolic blood pressure < 90 mm Hg despite fluid resuscitation or need for vasopressor support.
Respiratory failure	PaO ₂ < 60 mm Hg or postoperative ventilator requirement.
Renal failure	Creatinine > 2 × preoperative value or need for renal replacement therapy.
Intra-abdominal hemorrhage	Requiring surgical or endovascular intervention.
Pancreatic fistula	Output through a percutaneous drain after initial laparotomy or non-operative management beyond 4 wk, with confirmation by fistulography.
Pancreatic pseudocyst	Encapsulated fluid collection, usually outside the pancreas with a well-defined wall and homogeneous fluid density occurring more than 4 wk after the onset of pancreatic trauma.
Other gastrointestinal fistulas	Fistula occurs in the stomach, small intestine, colon, or biliary tract, with confirmation by fistulography.
Intra-abdominal abscess	Intra-abdominal fluid collection associated with fever or leukocytosis that discharged spontaneously or requiring surgical or radiologically guided drainage, with positive blood or fluid culture.
Peripancreatic abscess	The intra-abdominal abscess is limited around the pancreas.
Sepsis	According to the Sepsis-3.
Reoperation	Any unplanned relaparotomy for postoperative complications.
LOS	Total postoperative LOS, including all related

readmissions.

LOS: Length of stay.

Supplementary Table 2 Potential risk factors for Clavien–Dindo grade \geq III_b

Characteristics	Univariate logistic regression		P value	Multivariate logistic regression		
	Odds ratio	95%CI		Odds ratio	95%CI	P value
Male sex, <i>n</i> (%)	1.164	0.405-3.341	0.778	-	-	-
Age, median (IQR)	1.016	0.994-1.039	0.203	-	-	-
BMI, mean (SD)	0.986	0.912-1.066	0.716	-	-	-
Blunt injury, <i>n</i> (%)	3.280	0.690-15.606	0.135	2.319	0.655-8.215	0.192
ISS, median (IQR)	1.093	1.044-1.145	< 0.001	1.092	1.023-1.165	0.008
Abdominal AIS, median (IQR)	1.695	1.113-2.581	0.014	0.836	0.426-1.641	0.603
Pancreatic injury grade, <i>n</i> (%)						
I + II	Ref			Ref		
III + IV + V	1.514	0.821-2.794	0.184	1.102	0.476-2.552	0.821
Isolated pancreatic injury, <i>n</i> (%)						
No	Ref			Ref		
Yes	0.332	0.136-0.808	0.015	0.240	0.061-0.945	0.041
Duodenum injury, <i>n</i> (%)						
No	Ref					
Yes	1.139	0.533-	0.736	-	-	-

			2.434				
Vascular injury, <i>n</i> (%)							
No	Ref			Ref			
Yes	1.187	0.848- 3.894	0.125	2.081	0.861- 5.030	0.103	
Parenchyma organ injury, <i>n</i> (%)							
No	Ref						
Yes	1.400	0.786- 2.492	0.253	-	-	-	
Hollow organ injury, <i>n</i> (%)							
No	Ref			Ref			
Yes	1.487	0.823- 2.687	0.188	1.124	0.465- 2.714	0.795	
Shock on admission, <i>n</i> (%)							
No	Ref			Ref			
Yes	1.763	0.731- 4.252	0.197	1.438	0.784- 2.639	0.241	
Number of abdominal organ injuries, <i>n</i> (%)							
2	Ref						
≥ 3	1.186	0.993- 1.416	0.060	1.975	1.031- 3.784	0.040	
Time to Operation, <i>n</i> (%)							
< 24 h	Ref						
≥ 24 h	1.286	0.680- 2.430	0.439	-	-	-	
Drain types							
PG	Ref						

NPI	0.471	0.235-	0.035	0.437	0.203-	0.034
		0.947			0.940	

IQR: Inter-quartile range; BMI: Body mass index; SD: Standard deviation; ISS: Injury severity score; AIS: Abbreviated injury scale; PG: Passive gravity; NPI: Negative pressure irrigation; Ref: Reference; CI: Confidence interval.

Supplementary Table 3 Postoperative days 7 infection rate in the matched cohort (considering only patients with POD 7 drain culture)

	PG (<i>n</i> = 43)	NPI (<i>n</i> = 36)	<i>P</i> Value
POD 7 infection			0.004
Yes	27 (62.8)	11 (30.6)	
No	16 (37.2)	25 (69.4)	

Postoperative infection of the drainage fluid was defined as bacterial infection. PG: Passive gravity; NPI: Negative pressure irrigation; POD: Postoperative days.

Supplementary Table 4 Qualitative microbiological analysis of infected Postoperative days 7 drain fluid samples in the matched cohort

	PG (<i>n</i> = 27)	NPI (<i>n</i> = 11)	<i>P</i> Value
G−	24 (88.9)	5 (45.5)	0.009
G+	5 (18.5)	7 (63.6)	0.017

In the PG group, 2 patients had mixed infections with G- and G+ bacteria. One patient had a mixed infection in the NPI group. G- bacteria mainly included *Serratia marcescens*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Enterobacter cloacae*, *Aeromonas hydrophila*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Flavobacterium*, *Klebsiella oxytoca*, and *Citrobacter*. G+ bacteria mainly included *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Enterococcus faecalis*, and *Enterococcus faecium*. PG: Passive gravity; NPI: Negative pressure irrigation.