Supplementary information

A novel clinical data management platform for acute pancreatitis

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Table S1 Noun interpretation in the article

Noun	Interpretation
A multicenter data management platform for AP	An application platform based on big data management of clinical diagnosis and treatment of acute pancreatitis, which mainly realizes the functions of data pre-structured management, rapid positioning of homogeneous cases, the modular construction of RCT research, multi-center data sharing, and linkage.
Full data acceptance+ post-structured application	Firstly, pure data technology is used to classify and save the big data generated by the clinic, and the index function is established. Then, according to the specific needs of a retrospective study, the big data are retrieved, and a database with a certain number of homogeneous cases and certain structural characteristics is established. Advantages: No professional processing or filtering is required before data saving, so it is relatively simple; the data volume is relatively complete. Disadvantages: This model makes it difficult to structure more critical data such as subjective and judgmental data, which often reflect more real diagnosis and treatment scenes and doctors' experiences and feelings. Objective big data are often difficult to reproduce the scene and experience. At the same time, the implementers of using data to reproduce the clinical scene are often low-level doctors or even medical students, so the quality of the work will be more limited.
Pre-structured setting+ valuable data application	Before data preservation, experienced experts have defined the clinical data needs of the disease, and made an early structured definition of all data requirements, including subjective and judgmental data, to highlight the value of key data of a disease, but strive to be comprehensive and accurate, to vividly reproduce the clinical scene and doctors' experience. The key is to improve the efficiency and experience of data utilization significantly.
Three-dimensional (patient, time, and item) presentation of full data	Clinical data were all marked as three dimensions of variables such as different patients, time, or items. The data platform can export any two of these variables (for example, a certain test value detected by different patients in different courses of the disease, different test values detected by one patient in a different course of the disease, or different test values detected by a different patient in a certain course of the disease).
Homogeneous case retrieval mode based on feature markers	We obtained homogeneous cases by searching the combination of feature options of cases in the "feature marker pool" filled with all variables representing the diagnosis and treatment features (feature markers), which are all concentrated in a multi-selectable "pool" since all diagnosis and treatment characteristics of each case are defined at the end of treatment and expressed in a unified way. Furthermore, feature markers include disease classification standard, organ failure, imaging features, severe events, infection, major treatment events, treatment mode, gender, aetiology, and outcome, with a total of 163 species.
Big event	It refers to important therapeutic events in the whole process of diagnosis and treatment, such as antibiotic use, mechanical ventilation, renal replacement treatment, fluid resuscitation, vasoactive drugs, enteral nutrition, drainage, debridement, glucocorticoid, and artificial liver.

Table S2 Judgment data (characteristic markers) of the SAP management platform

Feature markers species	Content description
Data range	This center/all network
Classification of AP	RAC 2012, DBC, two-step procedure
Organ failure	ARDS, AKI, AHI, AGI, IAH, ACS, PE, AHF, and shock
Imaging features	Local complications: APFC, ANC, PP, WON, and IPN
	Special manifestations: peripancreatic/abdominal visceral tissue edema, necrosis, perforation, infection, portal hypertension, and false aneurysm
Serious events	Sepsis, gastrointestinal perforation/chylous fistula, bleeding/embolism in various parts, gastrointestinal disorders and infections, portal hypertension, and ketoacidosis
Infection site	Biliary, lung, abdominal pelvic cavity, intracranial, urinary system, wound, gastrointestinal tract, thorax, blood, and peripancreatic peritoneum
Specimen	Catheter, drainage, bile, alveolar lavage fluid, secretions, stool, cerebrospinal fluid, urine, sputum, and blood
Microorganism	Various bacteria
Drug resistance	Various resistant bacteria: ESBLs+/−, PPNG, KPC, AmpC, M/PDR, HLARE, SSBL, MRSE/A/CN, PNSP, CRE/-AB, VRE/SA, and so on
Big events	Mechanical ventilation, renal replacement treatment, artificial liver, vasoactive drugs, enteral nutrition, drainage of various parts, various operations, and glucocorticoid
Treatment mode	Step-up, skip-up
Gender	Male, female
Age	Adult
Date	Admission time, discharge time
Aetiology	Biliary, hypertriglyceridemia, alcoholic, drug-induced, hypercalcemia, overeating, trauma, and ERCP-induced
Treatment outcome	Recovery, death, improvement, and waiver

RAC: revised Atlanta classification; DBC: determinant-based classification; ARDS: acute respiratory distress syndrome; AKI: acute kidney injury; AHI: acute hepatic insufficiency; AGI: acute gastrointestinal injury; IAH: intra-abdominal hypertension; ACS: abdominal compartment syndrome; PE: pancreatic encephalopathy; AHF: acute heart failure; APFC: acute pancreatic fluid collection; ANC: acute necrotic collection; PP: pancreatic pseudocyst; IPN: infectious pancreatic necrosis; ESBL: extended-spectrum β-lactamase; PPNG: penicillinase-producing Neisseria gonorrhoeae; KPC: Klebsiella pneumoniae carbapenemase; M/PDR: multiple/pleiotropic drug resistance; HLARE: high-level aminoglycoside-resistant enterococci; SSBL: super-spectrum β-lactamase; MRSE/A/CN: methicillin-resistant staphylococcus epidermidis/aureus/coagulase negative; PNSP: penicillin-nonsusceptible streptococcus pneumoniae; CRE/-AB: carbapenem-resistant enterobacteriaceae/acinetobacter baumannii; VRE/SA: vancomycin-resistant enterococcus/staphylococcus aureus; ERCP: endoscopic retrograde cholangiopancreatography.

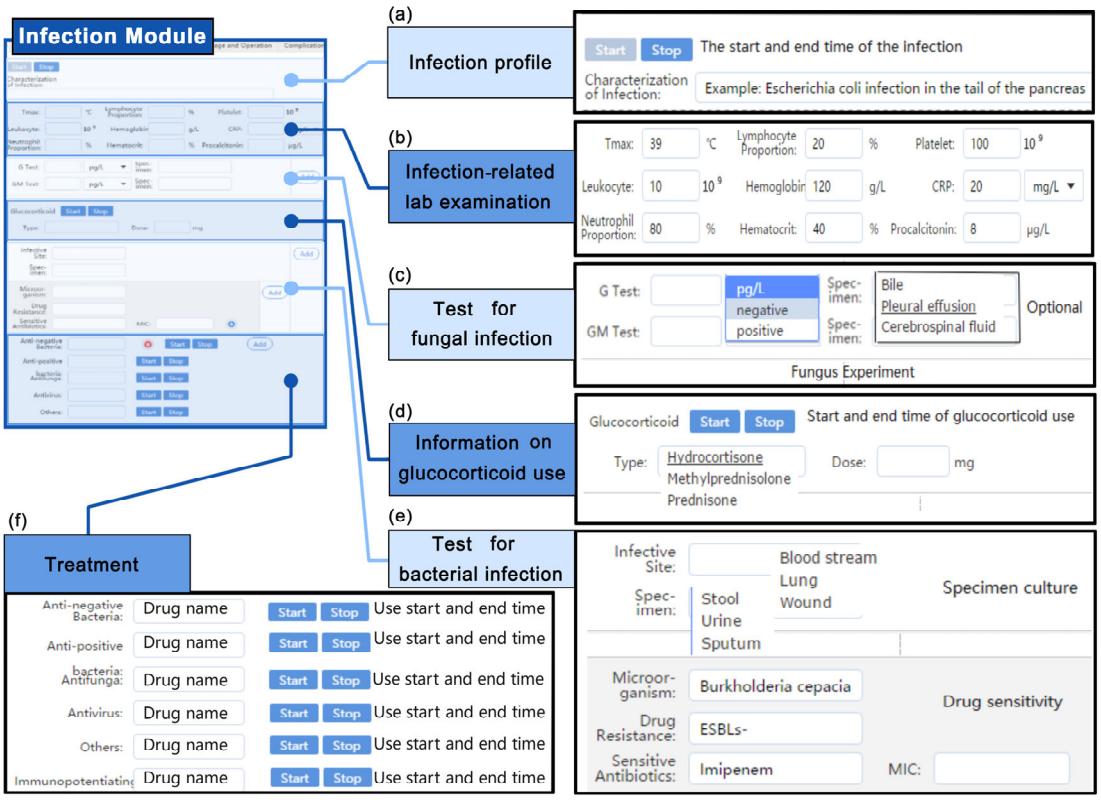
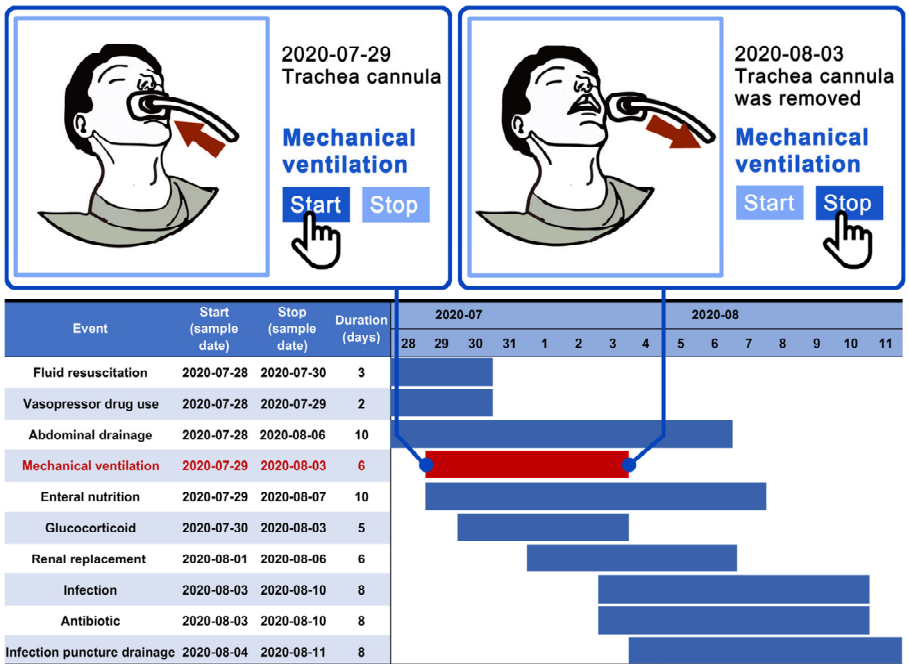


Fig. S1 Platform data presentation for the infection module. (a) Infection profile: according to the specific situation of the case, the clinician freely entered the profile of the infection when it exceeded the pre-set data structure. (b) Infection-related lab examination: inputting measurable digital data of general infection, which can be imported from the hospital information system (HIS). (c) Test for fungal infection: detailed special fungal-infection data can be entered by filling in the blank or be imported from the HIS. (d) Information on glucocorticoid use: recording the type, dose, and starting and ending time of glucocorticoid use. This major-event data can be used for an automatic Gantt chart. (e) Test for bacterial infection: detailed special bacterial-infection data can be entered by filling in the blank or be imported from the HIS. (f) Treatment: recording all relevant treatment data, including antibacterial treatment, antiviral treatment, mechanical ventilation, and enteral nutrition. This major-event data can be used to automatically plot a Gantt chart.



Event	Start (sample date)	Stop (sample date)	Duration (days)
Fluid resuscitation	2020-07-28	2020-07-30	3
Vasopressor drug use	2020-07-28	2020-07-29	2
Abdominal drainage	2020-07-28	2020-08-06	10
Mechanical ventilation	2020-07-29	2020-08-03	6
Enteral nutrition	2020-07-29	2020-08-07	10
Glucocorticoid	2020-07-30	2020-08-03	5
Renal replacement	2020-08-01	2020-08-06	6
Infection	2020-08-03	2020-08-10	8
Antibiotic	2020-08-03	2020-08-10	8
Infection puncture drainage	2020-08-04	2020-08-11	8

Fig. S2 Schematic diagram of major events of mechanical ventilation. Major events during patient hospitalization include fluid resuscitation, vasopressor drug use, abdominal drainage, mechanical ventilation, enteral nutrition, glucocorticoids, renal replacement, infection, antibiotics, and infection puncture drainage. Taking mechanical ventilation as an example, a patient was intubated on July 29, 2020 to start mechanical ventilation (MV), and tracheal intubation was removed on Aug. 3, 2020 to end MV. Therefore, the patient's MV lasted for 6 d, which is presented using a Gantt chart.