References

1. Lababidi Z. Aortic valvuloplasty. Am Heart J. 1983;106:751–2.
2. Vergnat M, Asfour B, Arenz C, Suchowerskyj P, Bierbach B, Schindler E, et al. Aortic stenosis of the neonate: a single-center experience. J Thorac Cardiovasc Surg. 2019;157:318–26.
3. McElhinney D, Lock J, Keane J, Moran A, Colan S. Left heart growth, function, and reintervention afeter balloon aortic valvuloplasty for neonatal aortic stenosis. Circulation. 2005;111:451–8.
4. Saung M, McCracken C, Sachdeva R, Petit C. Outcomes following balloon aortic valvuloplasty versus surgical valvotomy in congenital aortic valve stenosis: a meta-analysis. J Invasive Cardiol. 2019;31:133–42.
5. Wazir DH, Qureshi AU, Hyder SN, Sadiq M. Inmediate andmidterm results of balloon aortic valvuloplasty in children with aortic valve stenosis with special reference to dysplasic aortic valve. J Ayub Med Coll Abbottabad. 2019;31:517–21.

Luis Fernández González*, Roberto Blanco Mata, Josune Arriola Meabe

Cardiología Intervencionista, Hospital Universitario de Cruces, Vizcaya, Spain

Maite Luis García, Jose Miguel Galdeano Miranda

Cardiología Pediátrica, Hospital Universitario de Cruces, Vizcaya, Spain

* Corresponding author.
E-mail address: luisfg82@hotmail.com (L.F. González).

https://doi.org/10.1016/j.anpede.2021.02.010

Desing of a risk map in a paediatric emergency department☆

Diseño de un mapa de riesgos en un servicio de urgencias pediátrico

Dear Editor:

Patient safety is a perspective from which to understand health care without which the latter would be meaningless.[1]

In paediatric emergency departments (PEDs), the risk of adverse effects is high due to the particular characteristics of their patients.[2] The clinical information paediatricians obtain from parents and medication dosages are individualised, which involves calculations that provide opportunities for error.

Traditionally, patient safety refers to event investigation and analysis, which is difficult to translate to learning and prevention of repeated errors. In Spain, several studies have been developed with this approach (ENEAS, APEAS, EARCAS, SYREC and EVADUR). They contribute to the detection of errors once they have already happened, so other, proactive tools need to be implemented, such as risk maps, to promote awareness of probable or demonstrated risks and harm in care delivery.[3] The aim of our study was to describe our experience with the design and development of a risk map for our own care setting.

We developed the risk map using the Failure Modes and Effects Analysis (FMEA) approach.[4] We started by defining the emergency care processes and subprocesses from arrival of the patient to the desk to discharge from the PED. We identified risks in a brainstorming process that involved a multidisciplinary team (paediatricians, nurses and security, laboratory, radiology, administrative and pharmacy staff) based on staff statements concerning 719 events (2012–2018) and the review of complaints and suggestions filed by families (635 in the period under study). We collected the data in a FMEA template, including the specific care process and subprocesses, the defined failure mode or risk, its causes, the type of effect and possible measures for control or improvement. We estimated the severity (S), probability of occurrence (O) and probability of detection (D) of the events (Table 1), rating each on a scale from 1 to 5. The ratings were established by consensus by all participating professionals. We stratified risk based on the risk priority number (RPN): $RPN = S \times O \times D$. The resulting numbers could range from 1 to 125, with higher values indicating greater priority. We developed the risk map prioritising the causes that corresponded to the highest RPNs for the purpose of developing improvement strategies (essential risk map).

In the initial round, we identified 7 urgent care processes (admission, triage, initial nursing care, medical care, diagnostic testing, treatment and discharge destination), 17 subprocesses, 60 potential failures or risks with 92 effects and 199 causes. The essential risk map ended up comprising 15 subprocesses with 19 effects with a RPN greater than 30 (Table 2).

The proposed risk map reviews every care process in emergency care and allows their proactive analysis. To develop it, we used brainstorming and reactive analytics. We used brainstorming repeatedly in the FMEA[4] as a proactive safety measure. Incident analysis is weaker for this purpose.[5] An aspect worth highlighting was the incorporation of the information and feedback provided by families, given the importance of the experience

☆ Please cite this article as: Arias Constantí V, Rife Escudero E, Trenchs Sainz de la Maza V, Blanco González JM, Luaces Cubells C. Diseño de un mapa de riesgos en un servicio de urgencias pediátrico. An Pediatr. 2022;96:267–270.

Table 1 Classification of severity (S), occurrence/frequency (O) and detection (D).

Severity	Criterion: failure mode based on impact on patient (S)	Ranking
Minimum	Failure of small importance unlikely to cause any actual harm even if it reaches the patient	1
Minor	Failure that may reach the patient and would not cause harm, but would require monitoring or intervention to ensure patient is not harmed	2
Moderate	Failure that causes or contributes to temporary harm and requires or prolongs hospitalization or requires intervention	3
Critical	Failure that causes or contributes to permanent harm or threatens the life of the patient, requiring intervention to save patients' life	4
Catastrophic	Failure that may cause permanent disability or death if it reaches the patient	5
Occurrence	Criterion: probability of occurrence of failure mode (F)	
Infrequent/unlikely	Isolated failures in the specific process. It is probable in the life of the process, but unlikely to occur in years at a time	1
Low	Failure that occurs infrequently in the process or similar processes (once a year)	2
Moderate	Probable failure. The failure has occurred with relative frequency in the past in the specific process or similar processes (several times a year)	3
High	Very probable failure. The failure is expected to occur frequently (every month)	4
Very high	Nearly inevitable failure. The failure occurs very frequently, daily or weekly	5
Detection	Criterion: likelihood of detection of failure mode (F)	
Almost certain	The failure is obvious. It is highly unlikely that it will not be detected by existing controls (95—100%)	1
High	The failure, while obvious and easily detectable, could escape an initial check, but would certainly be detected later on (75—94%)	2
Moderate	The failure is detectable and may not reach the patient. It may be detected in the late stages of the process (40—74%)	3
Low	The failure is intrinsically difficult to detect with the protocols currently in place (6—39%)	4
Unlikely	The failure cannot be detected. It is nearly certain to reach the patient (0—5%)	5

Table 2 Failure modes with a risk priority number (RPN) greater than 30 (essential risk map).

Failure mode	Risk	Preventive measures	RPN
Admission			
Delay in collection of patient data	Clinical worsening	Increase staff	48
	Risk of infection	Implement use of bar code to read data	36
Initial nursing care			
Not performed by moving patient to the consultation area	Delay in treatment initiation	Implementation of patient arrival and triage protocol	36
	Missing clinical information in health records		48
Medical care			
Delay in providing care to patient	Clinical worsening	Specific training	40
	Patient discomfort		40
Failure to detect allergies	Adverse drug reaction	Specific training	80
Lack of medication reconciliation	Worsening of underlying disease	Pilot programme of medication reconciliation	48
Poorly performed physical examination	Inadequate care	Supervision of physicians in training; mini-Clinical Evaluation Exercise	48
Errors in diagnosis	Inadequate care	Supervision of physicians in training; mini-Clinical Evaluation Exercise	48

Table 2 (*Continued*)

Failure mode	Risk	Preventive measures	RPN
Laboratory			
Error in identification of samples and patients	Mixing up health records; inadequate care	Patient identification wristbands	36
Problems in sample collection	Delay in necessary care	Training of nurses	36
Imaging tests			
Failure to perform test when indicated	Delay in necessary care	Supervision of physicians in training; mini-Clinical Evaluation Exercise	36
Treatment			
Identification error	Patient receives unnecessary treatment	Patient identification wristbands	36
Wrong dosage	Adverse drug reaction	Weight alarm	36
Omission of treatment	Delay in necessary care		75
Destination at discharge (admission to ward)			
Patient without medical directions	Delay in treatment initiation	Create checklist for use before admission to ward / medication reconciliation	60
Transfer of patient to ward under suboptimal conditions	Clinical worsening during transfer	Create checklist for use before admission to ward	48
	Duplication of medical treatment	Documentation of discharge report in health records	48

of patients and families and their involvement in care processes.[6]

When we analysed the distribution of failures, causes and effects, we found the highest number of causes of error in medical care (which could be due to our centre being a university hospital that has physicians in training on staff), diagnostic tests (processes that are not performed in full within the PED and may involve several professionals and spaces) and treatment (calculation of doses for weight under stressful circumstances).

As for the abridged version of the risk map, we ought to highlight the failure to identify allergies, omissions of treatment and transfer of patients to the ward without adequate medical directions. Improvement measures have been implemented, such as staff training, improvements in electronic health records and use of a checklist before patient transfer. The implementation of measures to prevent these severe failures has resulted in the reduction of other errors of lesser impact.

Some of the limitations of the study are that it yielded a lengthy document, that its implementation would be costly, and that it may not be possible to extrapolate it to facilities of different characteristics.

To conclude, we ought to highlight that a risk map is a tool for proactive risk management. Its findings will help us assess our activity, identify problems and implement improvement measures.

Appendix A. Individuals that collaborated in the development of the risk map

Elisabet Rife Escudero, Gemma Bial Vellve, Isabel de Andrés Yagüe, Susana Ortiz Solsona, Mercedes Jabalera, Esther Álvarez Matesanz, Mercedes Gimeno Mayor, Eva Gargallo Burriel, Yolanda Fernández Santervas, David Muñoz Santanach, Cristina Parra Cotanda, Victoria Trenchs Sainz de la Maza, Jesús Velasco Rodríguez, Josep Munuera del Cerro, Omar Rodríguez Forner, Francisco José Cambra Lasaosa, María Mercedes Molina Carbonell, Carles Luaces Cubells and José Blanco González.

References

1. Tejedor Fernández M, Montero Pérez FJ, Miñarro del Moral R, Gracia García F, Roig García JJ, García Moyano AM. Diseño e implantación de un plan de segu-ridad del paciente en un servicio de urgencias de hospital: ¿cómo hacerlo? Emergencias. 2013;25:218–27.
2. Mojica E, Izarzugaza E, Gonzalez M, Astobiza E, Benito J, Mintegi S. Elabora-tion of a risk map in a paediatric Emergency Department of a teaching hospital. Emerg Med J. 2016;33:684–9.
3. Tomás Vecina S, Bueno Domínguez MJ, Chanovas Borrás M, Roqueta Egea F, Grupo de trabajo Mapa de Riesgos SEMES. Diseño y validación de un mapa de riesgos para la mejoría de la seguridad del paciente en los servicio de urgencias hospitalarios. Trauma Fund MAPFRE. 2014;25:46–53, 1.
4. Institute for Healthcare Improvement and QualityHealthCare.org [Accessed 4 July 2019]. Available from: http://www.ihi.org/resources/Pages/Tools/FailureModesandEffectsAnalysisTool.aspx, 2004.
5. Rishoej RM, Almarsdóttir AB, Christesen HT, Hallas J, Kjeldsen LJ. Medication errors in pediatric inpatients: a study based on a national mandatory reporting system. Eur J Pediatr. 2017;176:1697–705.
6. Parra C, Carreras N, Vergés A, Trenchs V, Luaces C. Patient experience in a Spanish pediatric emergency department. Pediatr Emerg Care. 2020;36:456e459.

Vanessa Arias Constanti[a,b,*], Elisabet Rifé Escudero[b], Victoria Trenchs Sainz de la Maza[a,b], Jose Manuel Blanco González[b], Carles Luaces Cubells[a,b]

[a] *Influencia del entorno en el bienestar del niño y del adolescente, Institut de Recerca Sant Joan de Déu, Esplugues de Llobregat (Barcelona), Spain*
[b] *Servicio de Urgencias de Pediatría, Hospital Sant Joan de Déu, Esplugues de Llobregat (Barcelona), Spain*

* Corresponding author.
E-mail address: varias@sjdhospitalbarcelona.org (V. Arias Constanti).

https://doi.org/10.1016/j.anpede.2021.02.009

Acute pancreatitis in children with covid-19 associated multisistem inflammatory syndrome☆

Pancreatitis aguda en paciente pediátrico afecto de síndrome inflamatorio multisistémico atribuido a covid-19

Dear editor:

Multisystem inflammatory syndrome in children (MIS-C), first described in May 2020, is characterised by a significant inflammatory process with features similar to those of Kawasaki disease. Although the causal relationship has yet to be established, this syndrome exhibits a temporal association with the SARS-CoV-2 pandemic, and in most cases manifests in the context of past or recent infection by this virus.[1]

There is a dearth of data on cases of MIS-C. Although gastrointestinal symptoms are frequent in affected paediatric patients, there are few data and the literature is scarce on the subject of acute pancreatitis in patients with MIS-C.[2–5]

We present the case of a boy aged 10 years that presented to the emergency department of a tertiary care hospital with pain in the right abdomen accompanied by vomiting and fever of 9 days' duration. The patient had an unremarkable previous history other than the diagnosis in the preceding month of acute SARS-CoV-2 infection confirmed by PCR in the context of a self-limited febrile illness. The physical examination revealed generalised macular rash, cracked red lips, bilateral non-suppurative conjunctival injection and abdominal pain with guarding at the level of the right iliac fossa. The patient underwent abdominal ultrasound and computed tomography scans, which did not reveal features compatible with acute abdomen or any other intraabdominal abnormalities, including the region of the pancreas. Blood tests evinced leucocytosis with neutrophilia and marked elevation of cardiac enzymes (Table 1). This prompted performance of an echocardiogram that revealed dilatation of the left coronary artery and mild pericardial effusion. The clinical and laboratory features were indicative of Kawasaki-like MIS-C attributed to coronavirus 2019 disease (COVID-19) due to detection of IgG antibodies against SARS-CoV-2, leading to initiation of treatment with intravenous immunoglobulin and acetylsalicylic acid at an anti-inflammatory dose.

During the stay, the patient exhibited significant improvement of clinical manifestations and laboratory markers with pharmacological treatment (Table 1).

However, on day 8 of the stay, the patient developed abdominal pain that radiated from the epigastrium. This prompted the performance of an abdominal ultrasound scan that revealed thickening of the head and body of the pancreas and blood tests that evinced elevation of pancreatic enzymes (Table 1). These findings, combined with the compatible manifestations, met the Arkansas criteria for acute pancreatitis (imaging features compatible with pancreatic involvement, elevation of pancreatic enzymes and abdominal pain in the left hypochondrium/epigastrium). The patient exhibited clinical, laboratory and sonographic improvement in successive follow-up evaluations after conservative management with a soft food diet and partial bed rest, without requiring specific treatment of the pancreatitis. The patient stayed in the inpatient ward for 15 days.

To date, few authors have reported acute pancreatitis in paediatric patients with MIS-C.[3–5]

The association between acute pancreatitis and SARS-CoV-2 and its pathophysiological mechanism remain unknown. Several studies support the hypothesis of indirect involvement of the pancreas after the virus comes into contact with angiotensin-converting enzyme 2 (ACE2) receptors in pancreatic tissue, although further research is needed to establish the association between acute pancreatitis and SARS-CoV-2 infection in children.[6]

We need more data for the paediatric population to investigate this new syndrome and its potential complications.

☆ Please cite this article as: Traba Zubiaurre M, Eizaguirre Arocena FJ, Urrutikoetxea Aiartza M, Izquierdo Iribarren A. Pancreatitis aguda en paciente pediátrico afecto de síndrome inflamatorio multisistémico atribuido a COVID-19. An Pediatr. 2022;96:270–272.