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http://dx.doi.org/10.1016/j.eimc.2016.07.014
0213-005X/

Detection of foodborne *Salmonella* Typhimurium outbreaks

Detección de brotes de toxiinfecciones alimentarias por Salmonella *Typhimurium*

To the Editor,

We have read with a great interest the valuable editorial by Dr Ballesté-Delapierre and Dr Vila-Estapé[1] in which they ask about the detection of *Salmonella* foodborne outbreaks (FO) in Spain.

In Spain for the period 2012–2014, el Centro Nacional de Epidemiologia[2] reports that 702 FO of *Salmonella* were notified and *S.* Typhimurium (ST) was the etiologic agents in less than 20% of these outbreaks. By microbiologic culture, there were 4329 reported cases of ST and 135 cases of Monophasic *S.* Typhimurium (MST). However, the most frequent agent (over 50%) of FO was *S.* Enteritidis (SE), and a total of 3656 reported cases of SE. In addition, very few studies of FO caused by ST or MST have been published in Spain in the last 10 years,[3–5] despite the fact that the first description of epidemic MST associated with pork products was made in Spain by Echeita and co-authors in 1997.[6]

However, FO caused by ST in Spain probably are more frequent than the official figures reflect. We put forward some epidemiologic arguments that could explain why these outbreaks are more difficult to detect than FO caused by SE (Table 1):

- The food vehicle for FO caused by SE, the principal reservoir being poultry, is frequently eggs and egg products, which are consumed raw or semi-raw in high quantities and which could have high concentrations of *Salmonella*. The ST food vehicle is more variated in its animal reservoirs, which include cattle, chicken, rodents, and swine; the high prevalence of ST and MST in the Spanish pig farms has been highlighted.[7] Concentrations of ST depend on how the food vehicle has been processed. In the case of pork derivatives, some products are cured and ready to eat, consumption may be low each occasion and ST concentrations are like to be small. In addition, dried pork sausage and chorizo were the food vehicle in the two mentioned FO.[4,5]
- Dependent on exposure, the FO caused by SE may affect a high number of people, and may have a point source epidemic curve. Exposed people of all ages can be infected with symptoms and the severity depends on patient's characteristics. The attack rate is high although the hospitalization rate is usually low. Receptions, family celebrations, and popular festivities are places where these FO originate; they have a short duration and an incubation period of 6–72 h. Presentation, frequently takes the form of clusters of cases. These FO could detect by the epidemiologic surveillance before *Salmonella* microbiological characterization.
- In general, FO caused by ST may be of prolonged duration and the epidemic curve could be a continuing common source. The attack rate may be low and the people affected are children, old people, and adults with immuno-deficiencies; the illness is frequently severe with a high hospitalization rate. Because of the low concentrations of ST in the products, infection in healthy adults could be asymptomatic or involve only mild symptoms. The incubation period is longer and can be up 16 days or more. Presentation usually takes form of sporadic cases.[8] However, ST or MST can produce point source FO when the agent's concentration in the food vehicle is high and more than one *Salmonella* serotype may be associated with the same FO. Detecting these FO requires the microbiological characterization of the *Salmonella* strains, including serotypes, phage types, and more advanced molecular methods such as pulsed field electrophoresis, multiple-locus variable-number tandem repeat analysis, and whole-genome sequencing.

Following studies in the United States (U.S.), one *Salmonella* isolate case in a culture may represent 38.6 cases in the community.[9] In the period 2012–2014, Spain reported an annual mean of 5600 cases of *Salmonella*[2] and following this estimation more than 200,000 cases could have occurred; indeed Spain is already the European country with the second highest rates of Salmonella

Table 1
Some differential characteristics of foodborne outbreaks of *S.* Typhimurium and *S.* Enteritidis.

Outbreak characteristics	*S.* Typhimurium	*S.* Enteritidis
Animal reservoirs	Swine, cattle, poultry, birds, rodents, reptiles, pets, etc.	Poultry, birds, reptiles, pets, etc.
Predominant food vehicles	Pork and pork products	Egg and egg products
Salmonella concentration	Low	High
Food characteristics	Cured, ready to eat	Raw or semi-raw
Food preparation	Separate portions (e.g., pork sausages)	Whole food (e.g., mayonnaise)
Food consumption	Low each time	Usually high
Incubation period	6 h to 15 days or more	6–72 h
Attack rate	Low	High
Onset	Gradual	Abrupt
Epidemic curve	Continuing common source	Point source
Outbreak duration	Weeks or months	Days
Persons at risk of symptomatic infection and microbiologic diagnosis	Children, old people, individuals with immuno-deficiencies	All exposed people
Illness	Frequently severe	Depend on patient's characteristics
Hospitalization	20–30% patients or more	Less than 10–20% patients
Place	Geographical dispersion affecting several cities and zones	Receptions, family celebrations, popular festivities, etc.
Predominant seasons	All year	Summer
Usual presentation	Sporadic cases	Clusters of cases
Outbreak extension	Community	Collective
Outbreak reported	Low	High
Outbreak detection	Microbiologic characterization and surveillance	Epidemiologic surveillance

infections.[10] When we consider that most *Salmonella* infections are transmitted by foods, the implementation of a specific surveillance by a foodborne diseases network such as those in the U.S. and other countries could usefully to increase detection, control, and prevention of *Salmonella* and other etiologic agents of FO.[9]

References

1. Ballesté-Delpierre C, Vila-Estapé J. Why are we still detecting food-related Salmonella outbreaks in Spain. Enferm Infecc Microbiol Clin. 2016;34:541–3.
2. Centro Nacional de Epidemiología, http://www.isciii.es/ISCIII/es/contenidos/fd-el-instituto/publicaciones.shtml. Web visited December 4 Resultados de la vigilancia epidemiológica de las enfermedades transmisibles e Informes del sistema de información microbiológica. Años 2012, 2013, 2014. Madrid: Instituto de Salud Carlos III. Ministerio de Economía, Industria y Competitividad; 2016.
3. Bances M, Herrero A, González Y, Rodicio MR, González-Hevia MA. Brote de gastroenteritis en una guardería causado por una cepa de *Salmonella entérica* serovar Typhimurium portadora del plásmido híbrido de resistencia-virulencia pUO-*St*VR2. Enferm Infecc Microbiol Clin. 2007;25:376–81.
4. Arnedo-Pena A, Sabater-Vidal S, Herrera-León S, Bellido-Blasco JB, Silvestre-Silvestre E, Meseguer-Ferrer N, et al. An outbreak of monophasic and biphasic Salmonella Typhimurium and Salmonella Derby associated with the consumption of dried pork sausage in Castellon (Spain). Enferm Infecc Microbiol Clin. 2016;34:544–50.
5. Hernández-Arricibita E, Santamaria-Zuazua R, Ramos-López G, Herrera-León S, Kárkamo-Zuñeda JA, Agirre NM. Brote de infecciones por Salmonella entérica serovar Typhimurium asociado al consumo de chorizo en Bizkaia. Enferm Infecc Microbiol Clin. 2016;34:577–8.
6. Echeita MA, Aladueña A, Cruchaga S, Usera MA. Emergence and spread of an atypical Salmonella enterica subsp enterica serotype 4,5,12:i:-, strain in Spain. J Clin Microbiol. 1999;37:3425.
7. Vico JP, Rol I, Garrido V, San Román B, Grilló MJ, Mainer-Jaime RC. Salmonellosis in finishing pigs in Spain. Prevalence, antimicrobial agent susceptibilities, and risk factor analysis. J Food Prot. 2011;74:1070–8.
8. Bellido-Blasco JB, González-Cano JM, Galiano-Arlandis JV, Herrero-Carot C, Tirado-Balaguer MD, Arnedo-Pena A, et al. Factores de riesgo de los casos esporádicos de diarrea por Campylobacter, Salmonella y rotavirus en niños preescolares. An Pediatr. 2007;66:367–74.
9. Voestsch AC, Van Gilder TJ, Angulo FJ, Farley MM, Shallow S, Marcus R, et al. FoodNet estimate of the burden of illness caused by nontyphoidal Salmonella infections in the United States. Clin Infect Dis. 2004;38 Suppl. 3:S127–34.
10. Molbak K, Simonsen J, Jorgensen CS, Krogfelt KA, Falkenhorst G, Ethlberg S, et al. Seroincidence of human infections with nontyphoid Salmonella compared with data from public health surveillance and food animals in 13 European countries. Clin Infect Dis. 2014;59:1599–606.

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http://dx.doi.org/10.1016/j.eimc.2017.01.001
0213-005X/

Tratamiento antibiótico de los pacientes con sepsis en los Servicios de Urgencias: acertar desde el principio

Antimicrobial therapy in septic patients in Emergency units: right from the outset

Sr. Editor:

Hemos leído con interés el manuscrito publicado por González del Castillo et al.[1] y queríamos realizar algunos comentarios. Es un estudio retrospectivo en el que se evalúa el impacto sobre la estancia y la mortalidad del empleo de tratamiento antibiótico adecuado en pacientes que acuden al Servicio de Urgencias por una infección. Se concluye que la terapia antimicrobiana inadecuada prolonga la estancia hospitalaria pero no se incrementa la mortalidad. Quizás, el reducido número de enfermos realmente graves (solo el 1,1% presentaban shock séptico) explica que no se encuentre relación entre el tratamiento inadecuado y la mortalidad. Llama también la atención que la mortalidad es inferior en los pacientes con tratamiento inadecuado, aunque por el reducido tamaño muestral esta diferencia no es significativa (4,8% *vs.* 12,6%).

Se ha cuestionado también por otros autores el impacto en el pronóstico del inicio precoz en las áreas de Urgencias del tratamiento antibiótico en la sepsis[2]. Sin embargo, existen multitud de evidencias que apoyan la necesidad de iniciar tratamiento adecuado precoz en los pacientes con sepsis[3,4].

Hace años realizamos un estudio prospectivo en pacientes que ingresan en UCI con sepsis. La principal conclusión fue que la administración de tratamiento antibiótico empírico adecuado antes de ingresar en UCI es un factor protector de mortalidad[4]. Hemos reanalizado nuestros datos para conocer el impacto del tratamiento adecuado en los pacientes que provenían de Urgencias. Eran 421 pacientes (mediana de edad de 63 años). Los focos más frecuentes fueron: abdomen (39,5%), pulmón (22,8%), piel y partes blandas (13,7%) y urológico (12,8%). En el análisis multivariante, el tratamiento adecuado iniciado en el Servicio de Urgencias fue un factor protector de mortalidad hospitalaria: *odds ratio* (OR) de 0,26; intervalo de confianza al 95%: 0,15-0,45; $p < 0{,}001$.

La sepsis y el shock séptico generan un creciente número de ingresos en las UCI españolas[5]. A pesar de que cada vez ingresan pacientes más añosos y con más enfermedades debilitantes, se ha observado en los últimos años un descenso significativo de la mortalidad en la sepsis[5,6,7]. La atención precoz del paciente con sepsis es una tarea clave para reducir su elevada mortalidad. Es conocido el alto nivel de ocupación que tienen los Servicios de Urgencias, lo cual hace difícil especialmente el reconocimiento de ciertos pacientes con sepsis[8,9].

Por ello, consideramos que hay que interpretar con cautela los resultados de González del Castillo et al. Sin embargo, seguro que coincidimos con estos autores en la necesidad de mejorar el conocimiento sobre el manejo de la sepsis y la calidad de la prescripción antibiótica en todos los ámbitos del sistema sanitario, siendo claves los Servicios de Urgencias[10]. Así contribuiremos a aumentar los tratamientos antibióticos adecuados y a reducir la mortalidad de la sepsis.

Bibliografía

1. González-del Castillo J, Domínguez-Bernal C, Gutiérrez-Martín MC, Núñez-Orantos MJ, Candel FJ, Martín-Sánchez FJ. Efecto de la inadecuación de la antibioterapia en Urgencias sobre la eficiencia en la hospitalización. Enferm Infecc Microbiol Clin. 2017;35:2018–213.
2. Vilella AL, Seifert CF. Timing and appropriateness of initial antibiotic therapy in newly presenting septic patients. Am J Emerg Med. 2014;32:7–13.
3. Ferrer R, Martin-Loeches I, Phillips G, Osborn TM, Townsend S, Dellinger RP, et al. Empiric antibiotic treatment reduces mortality in severe sepsis and septic shock from the first hour: Results from a guideline-based performance improvement program. Crit Care Med. 2014;42:1749–55.
4. Garnacho-Montero J, Gutiérrez-Pizarraya A, Escoresca-Ortega A, Fernández-Delgado E, López-Sánchez JM. Adequate antibiotic therapy prior to ICU