Operational tools applied in management of a human listeriosis case in Central Italy

Foglini M.[1], Blasi G.[1], Pomilio F.[2], Guidi F.[1], Acciari V.A.[2], Gattuso A.[3], Fiore A.[3], Duranti A.[1]

[1] Istituto Zooprofilattico Sperimentale dell'Umbria e delle Marche «Togo Rosati», Perugia, Italy
[2] Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise, National Reference Laboratory for *Listeria monocytogenes*, Teramo, Italy
[3] Istituto Superiore di Sanità, Roma, Italy

ISTITUTO ZOOPROFILATTICO SPERIMENTALE DELL'UMBRIA E DELLE MARCHE "TOGO ROSATI"

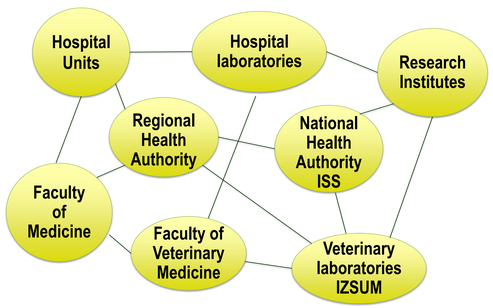
IZSAM G.CAPORALE TERAMO

Listeria monocytogenes National Reference Laboratory

Introduction

In the Marche region (Italy), the integration between different competencies in the fields of clinical and laboratory medicine, epidemiology and food safety has been carried out for several years. The collaboration has been formalized through a **Regional Working Group** (Figure 1) coordinated by Istituto Zooprofilattico Sperimentale Umbria Marche (IZSUM). The aim of the study was the "validation" of two operational tools for the management of a human listeriosis case occurred in March 2018.

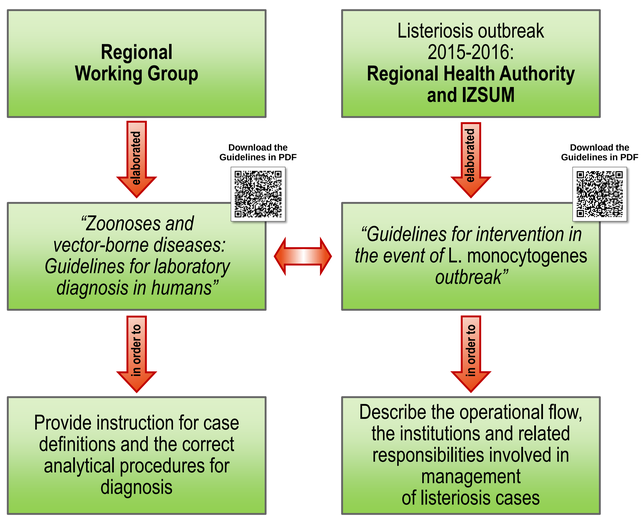
Figure 1. The regional network of different institutions involved in creation of the Regional Working Group "Zoonoses surveillance and role of hospital laboratories".

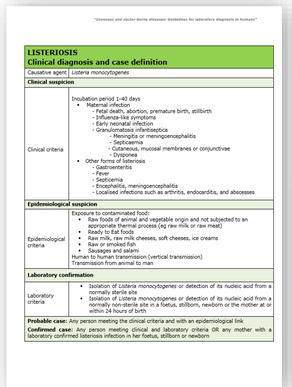


Would you like to contact us?

Materials and methods

Figure 2. Operational tools drafted by Regional Working Group and Regional Health Authority, Italy.

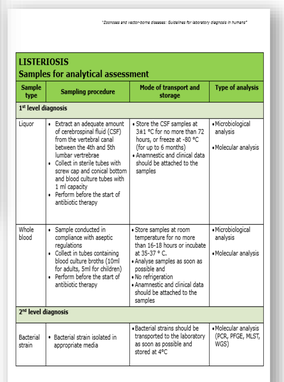




"Zoonoses and vector-borne diseases: Guidelines for laboratory diagnosis in humans"

LISTERIOSIS
Clinical diagnosis and case definition

Causative agent	*Listeria monocytogenes*
Clinical suspicion	
Clinical criteria	Incubation period 1-45 days • Pregnant women: - Fetal death, abortion, premature birth, stillbirth - Influenza-like symptoms - Early neonatal infection - Granulomatosis infantiseptica - Meningitis or meningoencephalitis - Septicaemia - Cutaneous, mucosal membranes or conjunctivae - Dysponea • Other forms of listeriosis - Gastroenteritis - Fever - Septicemia - Encephalitis, meningoencephalitis - Localised infections such as arthritis, endocarditis, and abscesses
Epidemiological suspicion	
Epidemiological criteria	Exposure to contaminated food: • Raw foods of animal and vegetable origin and not subjected to an appropriate thermal process (eg raw milk or raw meat) • Ready to Eat foods • Raw milk, raw milk cheeses, soft cheeses, ice creams • Raw meat products • Sausages and salami Human to human transmission (vertical transmission) Transmission from animal to man
Laboratory confirmation	
Laboratory criteria	• Isolation of *Listeria monocytogenes* or detection of its nucleic acid from a normally sterile site • Isolation of *Listeria monocytogenes* or detection of its nucleic acid from a normally non-sterile site in a foetus, stillborn, newborn or the mother at or within 24 hours of birth
Probable case: Any person meeting the clinical criteria and with an epidemiological link	
Confirmed case: Any person meeting clinical and laboratory criteria OR any mother with a laboratory confirmed listeriosis infection in her foetus, stillborn or newborn	



"Zoonoses and vector-borne diseases: Guidelines for laboratory diagnosis in humans"

LISTERIOSIS
Samples for analytical assessment

Sample type	Sampling procedure	Mode of transport and storage	Type of analysis
1st level diagnosis			
Liquor	• Extract an adequate amount of cerebrospinal fluid (CSF) from the vertebral canal between the 4th and 5th lumbar vertebrae • Collect in sterile tubes with screw cap and conical bottom and blood culture tubes with 1 ml capacity • Perform before the start of antibiotic therapy	• Store the CSF samples at 3±1 °C for no more than 72 hours, or freeze at -80 °C (for up to 6 months) • Anamnestic and clinical data should be attached to the samples	• Microbiological analysis • Molecular analysis
Whole blood	• Sample conducted in compliance with aseptic regulations • Collect in tubes containing blood culture broths (10ml for adults, 5ml for children) • Perform before the start of antibiotic therapy	• Store samples at room temperature for no more than 16-18 hours or incubate at 35-37 ° C. • Analyse samples as soon as possible and • No refrigeration • Anamnestic and clinical data should be attached to the samples	• Microbiological analysis • Molecular analysis
2nd level diagnosis			
Bacterial strain	• Bacterial strain isolated in appropriate media	• Bacterial strains should be transported to the laboratory as soon as possible and stored at 4°C	• Molecular analysis (PCR, PFGE, MLST, WGS)

Figure 3. Listeriosis: clinical diagnosis and case definition and analytical assessment by "Zoonoses and vector-borne diseases: Guidelines for laboratory diagnosis in humans".

Figure 4. Flow chart applied to the management of a listeriosis case.

Results

The human listeriosis case occurred in March 2018 has been managed through the operational flow (Figure 4).

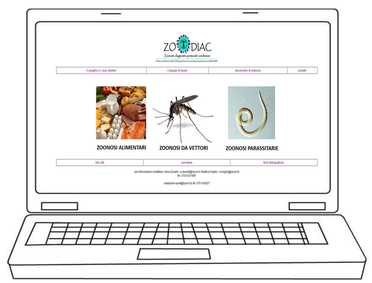
1. Case management of human listeriosis and isolation of *Lm* strain from the patient's cerebrospinal fluid.
2. Notification to Local Health Authority and data registration in the National Health Information System (NSIS-PREMAL).
3. Collection and molecular characterization of isolates.
4. Epidemiological investigation: interview with patient's parents, food and environmental samplings at patient's home and retail shops.
5. Elaboration of a final report: close correlation of isolated strains to the 2015-2016 outbreak.

Application of standardized operational tools to the case resulted in its effective management. Intersectoral collaboration among different institution and expertises and application of a laboratory-based surveillance network were crucial to identify and promptly manage the case.

Future development

IZSUM together with the Regional Working Group is creating a **Website** called *ZOODIAC*, in order to widely diffuse operational tools, procedure for diagnostic/investigative approaches and up-to-date data collected.

http://spvet.it/zoodiac.html



Link to home page ZOODIAC Project 2019

References

Duranti A., Sabbatucci M., Blasi G., Acciari V.A., Ancora M., Bella A., Busani L., Centorame P., Cammà C., Conti F.D., De Medici D., Di Domenico M., Di Marzio V., Filippini G., Fiore A., Fisichella S., Gattuso A., Gianfranceschi M., Graziani C., Guidi F., Marcacci M., Marfoglia C., Neri D., Orsini M., Ottaviani D., Petruzzelli A., Pezzotti P., Rizzo C., Ruolo A., Scavia G., Scuota S., Tagliavento G., Tibaldi A., Tonucci F., Torresi M., Migliorati G., Pomilio F. A severe outbreak of listeriosis in central Italy with a rare pulsotype associated with processed pork products. *J Med Microbiol.* 2018 Sep;67(9):1351-1360.