



SPANISH ASSOCIATION OF PAEDIATRICS

Recommendations for the unequivocal identification of the newborn[☆]



Ester Sanz López^{a,*}, Manuel Sánchez Luna^a, Segundo Rite Gracia^b, Isabel Benavente Fernández^c, José Luis Leante Castellanos^d, Alejandro Pérez Muñuzuri^e, César W. Ruiz Campillo^f, María Dolores Sánchez Redondo^g, en representación del Comité de Estándares. Sociedad Española de Neonatología

^a Hospital Universitario Gregorio Marañón, Madrid, Spain

^b Hospital Universitario Miguel Servet, Zaragoza, Spain

^c Hospital Universitario Puerta del Mar, Cádiz, Spain

^d Hospital Universitario Santa Lucía, Cartagena, Spain

^e Hospital Clínico Universitario Santiago de Compostela, Santiago de Compostela, Spain

^f Hospital Universitario Vall d'Hebron, Barcelona, Spain

^g Complejo Hospitalario, Toledo, Spain

Received 2 March 2017; accepted 13 March 2017

Available online 15 September 2017

KEYWORDS

Newborn;
Identification;
Deoxyribonucleic acid;
Deoxyribonucleic acid fingerprinting

Abstract Newborn identification is a legal right recognised by international and national laws. Moreover, improving the accuracy of correct patient identification is an important goal of patient safety solutions programmes. In this article, the Standards Committee of the Spanish Society of Neonatology establishes recommendations to ensure correct identification of the newborn whilst in hospital. Currently, the most reliable method of identification of the newborn is the combination of identification cord clamp and bracelets (mother bracelet, newborn bracelet and cord clamp with the same number and identical and exclusive barcode system for each newborn) and the collection of maternal and umbilical cord blood samples (for DNA testing only for identification purposes).

© 2017 Asociación Española de Pediatría. Published by Elsevier España, S.L.U. All rights reserved.

[☆] Please cite this article as: Sanz López E, Sánchez Luna M, Rite Gracia S, Benavente Fernández I, Leante Castellanos JL, Pérez Muñuzuri A, et al. Recomendaciones para la identificación inequívoca del recién nacido. An Pediatr (Barc). 2017;87:235.e1–235.e4.

* Corresponding author.

E-mail address: ester.sanz@salud.madrid.org (E. Sanz López).

PALABRAS CLAVE

Recién nacido;
Identificación;
Ácido
desoxirribonucleico;
Huella genética

Recomendaciones para la identificación inequívoca del recién nacido

Resumen La identificación del recién nacido es un derecho reconocido, tanto a nivel internacional como nacional, y la correcta identificación del paciente constituye una prioridad dentro de las políticas de mejora de la seguridad de la asistencia sanitaria. En este documento el Comité de Estándares de la Sociedad Española de Neonatología recoge las recomendaciones para garantizar la identificación inequívoca del recién nacido durante su estancia hospitalaria. La combinación del codificador neonatal (pulsera de la madre y pulsera del recién nacido y pinza de cordón con un mismo número y con un código de barras idéntico y exclusivo para cada recién nacido), junto con la recogida de una muestra de sangre materna y otra de sangre del cordón umbilical (para análisis de ADN en caso exclusivamente de duda de identidad) es actualmente el método más fiable de identificación del recién nacido.

© 2017 Asociación Española de Pediatría. Publicado por Elsevier España, S.L.U. Todos los derechos reservados.

In recent years, newborn identification has improved with the routine use of identification bands from the time of birth, avoiding the separation of mother and child during their hospital stay, and the creation of a health record for all newborns as opposed to only newborns that require hospital admission. Nevertheless, certain clinical circumstances may require the separation of mother and child after birth. Thus, despite the advances made for the correct identification of newborns, there is still a chance, however small, for the identity of a newborn to be uncertain or mistaken.

The purpose of the Standards Committee of the Sociedad Española de Neonatología (Spanish Society of Neonatology) in publishing this document was to establish, on the basis of current law and the available scientific evidence, guidelines for the unequivocal identification of newborns during their hospital stay, and to make the identification process homogeneous throughout Spain to avoid inconsistencies between different institutions and autonomous communities.

Newborn identification is a right recognised at both the national and international levels. Thus, article 7 of the Convention on the Rights of the Child (November 20, 1989) stipulated that every child has the right to a name and to acquire a nationality from birth, while article 8 specified that state parties were obligated to protect and, if necessary, re-establish the identity of a child, if the child had been partially or fully deprived of it.¹ In Spanish law, under the 1996 Organic Law on the Legal Protection of Minors, children are entitled to the rights recognised by the constitution and any international treaties in which Spain partakes.² More recently, the 2015 Law on Measures of Administrative Reform in the Field of the Administration of Justice and the Civil Registry underscored "certainty in the identification of newborns and the establishment beyond any doubt of the relationship between mother and child through the performance, when applicable, of the necessary medical, biometric and laboratory tests".³ In this regard, each autonomous community has developed regional legislation to guarantee the rights of children, including the right to be identified at birth.

On the other hand, the World Health Organisation has established the correct identification of patients as a priority

in the context of policies designed to improve health care safety. Based on the strategies proposed by the World Health Organisation, health care organisations should have systems in place that emphasise the primary responsibility of health care workers to check the identity of patients, promote the use of at least 2 identifiers to verify a patient's identity, and standardise the approaches to patient identification among different facilities within a health care system.⁴

Thus, health care professionals employed in hospitals with a maternity ward are responsible for guaranteeing this right.

An appropriate newborn identification system should fulfil the following requisites:

- Implementation at birth, in the delivery room or operating theatre, before mother and child are ever separated.
- Non-interference with mother-child bonding.
- Verification of the positive match between mother and newborn at birth, throughout the hospital stay and at discharge.
- Permanence.
- Reliability.
- Rapid resolution of doubts regarding identity.

There are different means for identification, and those used most commonly are fingerprints or footprints, identification (ID) bands, biometrics and DNA analysis.

The limitations of fingerprints and footprints are well known, since the prints obtained by health care staff not trained in this skill are of low quality, and over 70% of them are not good enough to serve as the sole means of identification.⁵⁻⁷ In fact, the American Academy of Pediatrics has been advising against the routine use of footprints and fingerprints alone for patient identification.⁸ Furthermore, in some instances fingerprinting or footprinting must be postponed due to the medical condition of the patient, which carries a risk of error.

One of the most frequently used methods is the fastening of tamper-resistant ID bands bearing the name of the mother, hour of birth and sex of the newborn around the wrist of the mother and the ankle of the newborn.

However, they are also not a reliable identification method, as they may get lost or switched (if the ID band is loose) and the information printed on them may be inaccurate or illegible.^{9,10}

To address the limitations of ID bands and reduce the risk of error, a coding system known as the *newborn identifier* was developed whose use has become widespread in recent years. This approach involves the use of different items (tamper-resistant mother and newborn ID bands, cord clamps and patient stickers for medical records and, in some cases, for civil documents) that bear the same number and an identical barcode that are exclusive to each newborn. In cases of multiple birth, a different identifier is used for each newborn. There is no question that the use of ID bands and clamps bearing the newborn identifier constitutes a significant improvement, but this system is not fail-safe either, as there is still a risk, however small, of a loose ID band coming off, or the cord clamp being misplaced if, for instance, the newborn requires umbilical vein catheterisation.

New digital biometric systems have been developed with the aim of reducing the flaws of traditional fingerprinting and supplementing the newborn identifier system. They are portable digital devices that integrate scanning a newborn code (barcode), the scanning and digital representation of the fingerprints of the mother and the child, and the submission of the data to an electronic register. However, a police study, although based on the analysis of only 20 samples, reported that the quality of digital fingerprints is insufficient for identification and that it offers no significant advantages compared to traditional ink fingerprinting.⁶

Some institutions supplement the neonatal identifier system with near-field communication tags embedded in the ID bands of mothers and newborns that continuously monitor the location of both and the distance between them during their hospital stay. If the distance exceeds a preset threshold, an alarm is activated to alert the staff.¹¹

In light of the limitations of the described methods, and since DNA analysis is the gold standard for the unequivocal identification of a person, numerous paediatrics societies, including the Asociación Española de Pediatría (Spanish Association of Paediatrics) have been advocating for years for the use of what are called "genetic signatures" in newborn identification.¹² Indeed, DNA analysis, and specifically the amplification of short tandem repeats by polymerase chain reaction methods, allows the evaluation of genetic polymorphisms and has been used widely in legal medicine to establish family relations.^{5,13-15} DNA can be obtained from different bodily tissues or fluids, such as saliva, but a dried blood spot on filter paper is easily conserved at room temperature and carries a lower risk of contamination compared to specimens obtained by other methods. Umbilical cord blood provides a valid alternative for newborn identification that avoids the unnecessary performance of venous or capillary puncture.¹⁶ There are various cord blood collection systems in the market, most of which incorporate newborn identifiers. At birth, immediately after cord clamping and with the prior consent of the mother, blood is collected from the placental end of the umbilical cord to make a dried blood spot specimen in an appropriately labelled piece of filter paper, and a sample of maternal blood is also collected. Subsequently, the two specimens are inserted in an envelope or sealed plastic container that is kept by the mother's

chart. The samples are conserved at room temperature. The procedure should be performed in the presence of the mother and the individual that accompanies her during birth or, in the absence of a companion, a health care professional. These samples are collected with the sole purpose of guaranteeing and enabling verification, should there be any doubts, of the correct mother-child match, and cannot be used for paternity testing or other type of genetic testing or clinical research. If analysis of the samples becomes necessary, we recommend that it be performed in compliance with the UNE-EN ISO/IEC 17025 standard, as specified by the National Commission for the Forensic Use of DNA of Spain.¹⁵ At present, some autonomous communities in Spain have introduced protocols for the collection of cord blood samples for the purpose of newborn identification, and many hospitals in other autonomous communities have introduced this method for mother-child matching at birth.¹⁷⁻¹⁹ The amount of time that samples are conserved varies between institutions, although at present minimum custody times range between 1 and 5 years. However, there is evidence that blood samples collected in filter paper and stored in biobanks for periods of up to 15 years are still valid for ID analysis.²⁰

Thus, taking into account current legislation and the available scientific evidence, the Standards Committee of the Sociedad Española de Neonatología considers that:

- Correct identification at the time of birth is a right of the newborn and a duty of the health care professionals.
- Newborn identification should be performed by the health care staff responsible for delivering care at birth after cutting the umbilical cord, before the mother and child are ever separated, and preferably in the presence of both parents. When both parents are not present or adequate communication with the mother is not possible due to medical reasons (such as sedation), newborn identification will be performed in the presence of a witness, preferably a family member or accompanying person authorised by the mother or, in their absence, an additional health care professional.
- Identification must not interfere with mother-child bonding, and efforts should be made to keep mother and child together throughout their hospital stay, unless the clinical condition of either prevents it.
- Identification will allow the verification of a positive match between mother and newborn at birth, throughout the hospital stay and at discharge.
- Due to the limitations of newborn fingerprints or footprints, they cannot be used as the sole identifier.
- DNA analysis is the gold standard to identify an individual unequivocally, and is a rapid and reliable method to resolve any doubts concerning identity.
- At present, the most recommended method for newborn identification consists of the combination of neonatal identifiers (tamper-resistant mother and newborn ID bands and cord clamp marked with the same number and identical barcodes that are exclusive to each newborn), along with a sample of maternal blood and a blood sample collected from the placental end of the umbilical cord.
- A cord blood sample will be collected, always with maternal consent and with the sole purpose of guaranteeing and verifying, if necessary, the correct mother-child

identification, and will not be used for the purpose of paternity testing or any other type of genetic testing or research.

- The collection of cord blood samples for the purpose of identification should be implemented in every autonomous community.
- Each institution will guarantee the correct identification and conservation of maternal and cord blood samples, although the establishment of standard custody times for these samples would be desirable.

Conflicts of interest

The authors have no conflicts of interest to declare.

Acknowledgments

We thank Professor Máximo Vento for reviewing this article.

References

1. UNICEF Comité Español [Consulted May 2015]. Available in: https://www.unicef.es/sites/www.unicef.es/files/convencion_derechos_nino_integra.pdf.
2. Ley Orgánica 1/1996 de 15 de enero de Protección Jurídica del Menor, BOE n.º 15. pp. 1.225 y ss.
3. Ley 19/2015, de 13 de julio, de medidas de reforma administrativa en el ámbito de la Administración de Justicia y del Registro Civil, BOE n.º 167. pp. 58.125 y ss.
4. Soluciones para la seguridad del paciente. Volumen 1, solución 2, Organización Mundial de la Salud, mayo de 2007.
5. Rodríguez-Alarcón J, Martínez de Pancorbo M, Santillana Ferrer L, Castro Espido A, Melchor Marcos JC, Linares Uribe A, et al. La «huella ADN» en lugar de la huella plantar en la identificación neonatal. *Med Clin (Barc)*. 1996;107:3–121.
6. Sanz-Díaz MC, Espinal-Ramón MI, Domínguez-Luna A, Fernández-Muñoz S, Cardesa-Sabio F, Hernández-Prieto M. La identificación del recién nacido: asignatura pendiente. *Matronas Prof*. 2012;13:66–72.
7. Unidades de neonatología estándares y recomendaciones de calidad. Informes, estudios e investigación 2014 Ministerio de Sanidad, Servicios Sociales e Igualdad. p. 69.
8. American Academy of Pediatrics. Committee on Fetus and Newborn and Committee on Obstetrics. Maternal and Fetal Medicine Guidelines for Perinatal Care. 4th ed; 1997. p. 123–4.
9. Gray JE, Suresh G, Ursprung R, Edwards WH, Nickerson J, Shiono PH, et al. Patient misidentification in the neonatal intensive care unit: quantification of risk. *Pediatrics*. 2006;117:e43–7.
10. Phillips SC, Saysana M, Worley S, Hain PD. Reduction in pediatric identification band errors: a quality collaborative. *Pediatrics*. 2012;129:1587.
11. Estrategia de Seguridad del Paciente en Osakidetza 2013–2016, edición: 1ª. Sep 2013. Coordinación de programas de salud pública y seguridad del paciente. Dirección de Asistencia Sanitaria, Osakidetza 2013.
12. Doménech E, Pérez Rodríguez J, Rodríguez-Alarcón J, Garrido-Lestache A, Sánchez Luna M. Comisión de identificación del recién nacido de la AEP. *An Esp Pediatr*. 1999;51:512–3.
13. Jeffreys AJ, Royle NJ, Patel I, Armour JA, MacLeod A, Collick A, et al. Principles and recent advances in human DNA fingerprinting. *EXS*. 1991;58:19–21.
14. Butler JM. Genetics and genomics of core short tandem repeat loci used in human identity testing. *J Forensic Sci*. 2006;51:253–65.
15. Crespillo-Márquez M, Paredes-Herrera MR, Barrio-Caballero PA, Luque-Gutiérrez JA, Crespo-Alonso S, Valverde-Villarreal JL, et al. La identificación genética como herramienta en la investigación de adopciones irregulares y sustracción de recién nacidos en España: experiencia del Instituto Nacional de Toxicología y Ciencias Forenses. *Rev Esp Med Legal*. 2016;42:4–9.
16. Crouch SJ, Rowell KR, Beiser SO. Umbilical cord blood for newborn DNA identification. *J Obstet Gynecol Neonatal Nurs*. 2007;36:12–308.
17. Decreto 246/2005, de 8 de noviembre, por el que se regula el ejercicio del derecho de las personas menores de edad a recibir atención sanitaria en condiciones adaptadas a las necesidades propias de su edad y desarrollo y se crea el Consejo de Salud de las Personas Menores de Edad. Boletín Oficial de la Junta de Andalucía, n.º 244 16-12-2005. Available in: <http://juntadeandalucia.es/boja/2005/244/boletin.244.pdf>.
18. Gobierno Vasco Información de Servicio de Partos [consulted 1 Dec 2016]. Available in: <http://www.euskadi.eus/informacion/h1-servicio-de-partos-h1/web01-ejeduki/es/durante parto.html>.
19. Programa de seguridad del paciente en la Región de Murcia. Identificación inequívoca de recién nacidos mediante gota de sangre del cordón umbilical. Available in: <http://www.murciasalud.es/pagina.php?id=183163&idsec=4974>.
20. Cardoso S, Valverde L, Odriozola A, Elcoroaristizabal X, Pancorbo M. Quality standards in Biobanking: authentication by genetic profiling of blood spots from donor's original sample. *Eur J Hum Genet*. 2010;18:848–51.