creando familias

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Early menopause: can I get pregnant?

Panorama of a patient's first contact with assisted reproduction: Preparing for the journey

Artificial intelligence in assisted reproduction

Reproduction International Group

UR reflections

Overcoming challenges, creating life

Being a mother is one of the most transcendental and wonderful experiences a woman can have.

IS MOTHERHOOD THE PROBLEM OR IS IT THE SYSTEM?

WHAT IS THE MOST DIFFICULT PART OF MOTHERHOOD?

WHAT ARE THE MAIN FEARS AND OBSTACLES?

HOW DOES ONE'S LIFE CHANGE AFTER HAVING A CHILD?

HOW DOES REPRODUCTIVE MEDICINE HELP WITH INFERTILITY?

WHAT DO THE PROCESSES LOOK LIKE?

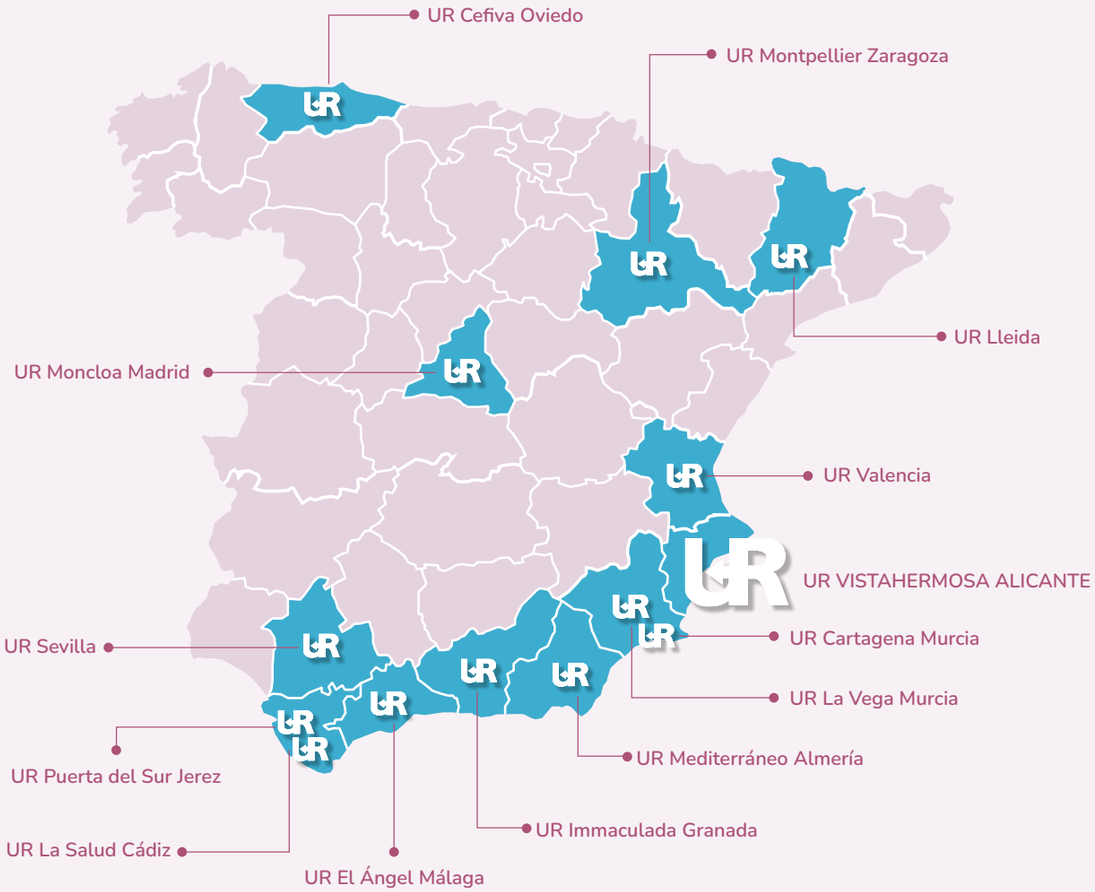
IS IT POSSIBLE TO BEAR THE COSTS OF FERTILITY TREATMENTS?

Nonetheless, nowadays being a mother isn't simply a personal decision, it's also an act loaded with economic, social and work-related implications. Beyond the challenges and difficulties, motherhood offers a special and priceless kind of compensation. However, social pressure is undeniable, and ambivalence about motherhood creates complex and contradictory emotions. Fear, uncertainty, worries and giving up certain aspects of one's personal life all weigh on this decision.

To address the social changes that affect women and their motherhood, Grupo Internacional UR has launched the campaign ***"UR reflections: overcoming challenges, creating life"***, found under the link **grupointernacionalur.com/reflexiones-ur/**, within its website, with the aim of opening a topical and lively intergenerational debate about issues that concern women today in terms of their reproductive project, reflecting the fears and thoughts that prevent women from taking the plunge into motherhood, or the economic difficulties in undertaking fertility treatment.

The advances in reproductive medicine have transformed infertility from an impenetrable barrier into an obstacle that, in many cases, can be overcome with the right support. Although the path to motherhood may be littered with emotional and economic challenges, science continues to advance, offering more and **more solutions** and increasingly improving the chances of success.

Today, the decision to be a mother is interwoven with a whole host of responsibilities and possibilities that go well beyond the personal sphere. It is the reflection of a society that supports and values women regardless of the decisions they make. Only in this way will it be possible to build a future in which motherhood, like so many other facets of female life, is a choice that is free, fair and fully supported.



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EGG DONATION

A safe alternative with high success rates

Irene Marín

Embryologist
UR Immaculada Granada

Egg donation is an assisted reproduction treatment in which, instead of using the patient's eggs, we use eggs from an anonymous donor.

We create embryos using a semen sample from the recipient's partner or a donor (double donation), which will then be transferred to the recipient woman's uterus.

Egg donation is a technique recommended for:

PATIENTS WITHOUT OVARIES, EXPERIENCING MENOPAUSE OR WITH A LOW OVARIAN RESERVE.

OLDER PATIENTS.
Oocyte quality is compromised with age, increasing the likelihood that embryos resulting from IVF will have chromosomal abnormalities. This reduces pregnancy viability and increases the risk of miscarriage.

PATIENTS WITH GENETIC DISORDERS, IN ORDER TO PREVENT TRANSMISSION TO THEIR OFFSPRING.

REPEATED FAILURES IN PREVIOUS IVF CYCLES.

Gamet donation is a highly regulated and established process, as accessing the donation programme requires meeting a series of legal, medical and ethical requirements. The donors are healthy women under 35 years of age, in good physical and mental health, with a BMI between 19 and 25. They must not have any sexually transmitted infections (STIs), and a genetic screening is also performed (according to current legislation) to prevent the transmission of hereditary diseases. The egg donation process is voluntary, altruistic and anonymous.

The donor is assigned by the same reproductive unit using computer software: Fenomatch. This innovative technology uses biometric algorithms to determine the similarity between two people by measuring facial points and distances. It can also reference over 100,000 facial points to identify the most similar donor, providing information that remains consistent regardless of age or weight fluctuations.

To select the ideal donor, physical characteristics such as hair colour and type, eye colour and skin tone are considered. Facial similarities are assessed using photos of both the donor and recipient, while genetic testing ensures compatibility, along with matching blood types.

During the egg donation process, the eggs assigned to the recipient can be either fresh or vitrified. When discussing in vitro fertilisation rates, embryo division and quality, pregnancy rates and live birth rates, no differences are found between the two groups. Therefore, we can say that vitrified eggs do not lose quality during this process, and once fertilised, they will follow a similar development to that of fresh fertilised eggs.

Success rate

In egg donation treatment, a high pregnancy rate is expected, with around 60% achieving pregnancy, reaching an accumulated rate of 90% after three attempts. This success rate is not influenced by the age of the recipient woman, as the eggs are from a donor. Therefore, it is a good option for women who have been unable to conceive through conventional means.

What do patients in Spain think about the ANONYMITY of GAMETE DONATION?

Rocío Núñez Calonge

Scientific Coordinator - *Grupo Internacional UR*

The donation of gametes is the assisted reproduction technique that has increased the most in recent years all over the world, becoming a subject of controversy in terms of the various ethical problems it poses. One of the most hotly discussed issues is anonymity.

The main criticisms of the anonymity of gamete donation are centred around the primary interest of those born via these techniques and, more specifically, around their health and interest in forming their own identity.

On the other hand, those who support the anonymity of gamete donation argue that this practice respects the interests of the donor and their privacy, as well as the wishes of the parents when it comes to determining their child's best interests.

A variety of factors, such as the growing number of babies born via these techniques, the advances in Science and Technology that make it easier to discover the identity of a person's genetic parents and the generalised belief that genetic information is important to protect one's health, have made this alleged right quite important, even causing some to question the ethical suitability of the practices of gamete donation (the Spanish Bioethics Committee, for example, has drawn up a document stating its opposition to anonymity). Nonetheless, this right is frequently assumed rather than explicitly justified.

In Spain, the anonymity of donation is supported by the majority of reproduction professionals. In line with this, the Spanish Fertility Society recently

prepared a document in which it spoke out in favour of preserving the identity of donors and keeping anonymity, although it did recommend that parents disclose the origins to children born using these techniques.

However, even though there many publications about the motivations and opinions of donors, there is no data in our country regarding the preference of patients when it comes to anonymity and the disclosure of where their children's genetic material comes from.

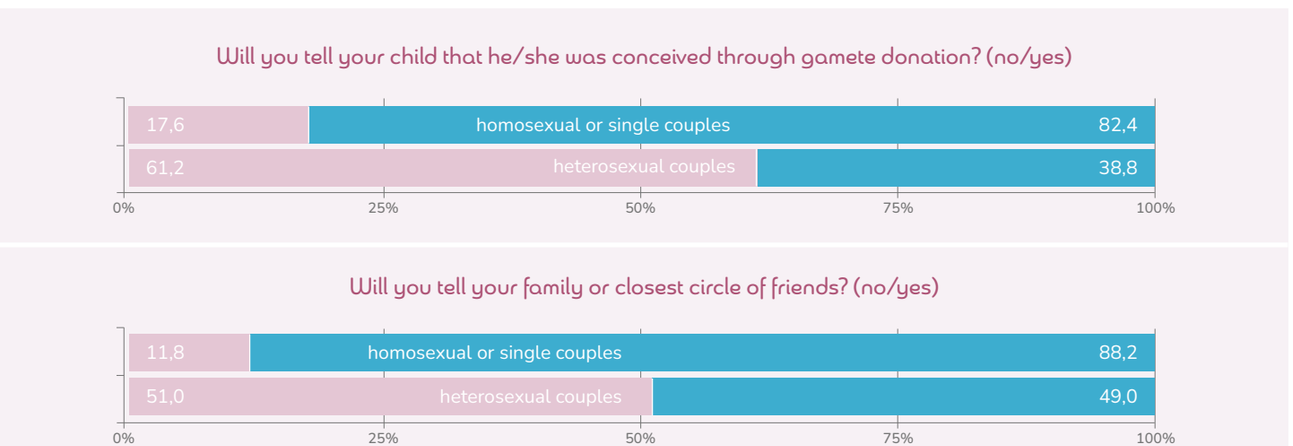
To address this uncertainty, for the first time in our country, Grupo Internacional UR carried out a survey among patients who are currently taking part in or have taken part in the gamete donation process. The centres that took part are located in Alicante, Madrid, Oviedo, Murcia, Almería, Granada, Jerez de la Frontera, Málaga, Valencia and Zaragoza. A survey was given to 66 persons in treatment for gamete donation and all of them responded anonymously.

The patients were asked about their sociodemographic characteristics, their opinions regarding the secrecy or disclosure of the method of conception, what type of information the child should have access to (identifying or non-identifying) and whether they intend to inform their child and family members of their origin.

The generic profile of the surveyed population is that of a woman (86.4%), with a heterosexual partner (74.2%) over the age of 39 (51.5%) with a university degree (71%), urban (62%) and without previous children (78.8%). 48.5% turned to oocyte donation, while 36.4% used semen donation and 15.2% embryo donation.

Among homosexual partners or women without a partner, 82.4% intend to tell their child and 88.2% to tell at least their most intimate circle that the child was conceived via gamete donation. However, among heterosexual partners, 60.0% do not plan on telling their child or have not even considered it, and 51% do not intend on telling even their closest family members.

70% of patients do not wish to know the identity of the donor, 67% think that it is not important for the child to know the origin of the gametes and 83% do not even consider the identity of the donor to be important. 90% do not believe that the donor has the right to know the identity of the children conceived with their gametes,



but do believe in anonymity regardless of the wishes of the children or of the parents receiving their gametes.

In terms of the profile of the patients, the factor that most influences their attitude towards the anonymity of the donor regardless of the remaining factors is the existence of previous children. All of the people surveyed who already have a previous child are more radical in rejecting the idea that it is important for children to know the origin of the gametes or the identity of the donor, or in rejecting the right of the donor to know the identity of the children.

The results of this study show that 70% of the patients who use donated gametes do not want to know the identity of the donor, and 67% believe that it is not important for the child to know their origins. This fact could be interpreted as a deliberately deceptive behaviour, especially if we assume that children have the fundamental right to know their genetic origins. However, parents may consider secrecy to be necessary if this right could contribute to the very harm that the parents seek to avoid.

It is obvious that it would be of crucial importance to know the opinion of the children born via gamete donation themselves, and this is the main limitation of the study.

However, it seems clear that prior **education** of society in general and of patients in particular is required in order for **tolerance, openness and gradual acceptance** of this method of conception to become the only ways of creating an obligation of disclosure.

GENETIC COUNSELLING

for assisted reproduction

Antonio Urbano

Director of the Genetics Unit
Grupo Internacional UR

The major technological advances arising in the field of Clinical Genetics in recent years have meant that this speciality has taken all branches of Medicine by storm, including Paediatrics, Oncology, Cardiology etc. and, of course, Reproductive Medicine.

This technological development, alongside the fact that genetic diseases are being addressed from a multidisciplinary point of view, has made us ever more capable of diagnosing a greater number of genetic disorders. Given the nature of hereditary genetic diseases, the diagnosis thereof entails a series of implications for the patient, both at a personal and at a family level, that are not seen in other types of diseases, giving rise to the need to offer the patient adequate genetic counselling.

Genetic counselling is a complex process that consists of individually assessing the implication of a genetic disease in a patient, imparting the available information regarding said disease to the patient and providing support in decision-making. In Spain, genetic counselling is regulated by the law on Biomedical Research 14/2007 establishing that it must take place "both before and after a genetic test or screening and even in the absence thereof".

The genetic counselling process is especially relevant in the scope of reproductive medicine, seeing as it makes it possible to assess the risks faced by a couple of having a child affected by a genetic disorder and, if necessary, to apply assisted reproduction techniques together with genetic diagnosis techniques to minimise said risk.

Generally speaking, genetic reproductive counselling is especially indicated in the following cases:

- Parents who are affected by or are carriers of a genetic disease.
- A family history (ascendents or descendants) of genetic diseases.
- Couples related by blood.
- Couples with a record of repeated abortions.
- Gestación previa con alteraciones fetales.
- Couples who wish to know the risk of having children affected by certain genetic diseases by way of a Genetic Compatibility Test.

The ideal moment in which to seek out genetic reproductive counselling is before attempting to fall pregnant, i.e. in the pre-conception stage. Although this is a complex process that differs depending on each case, in general it comprises the following steps:

1.

The geneticist collects all the information regarding the personal and/or family history related to the genetic disease in question, including the reconstruction of a family tree of at least three generations.

2.

The case is evaluated on an individual basis, assessing the risks for future children.

3.

Information is conveyed to the patient about the disease (implications, mode of inheritance, outlook, required genetic studies), the risk of passing on the disease to offspring and the reproductive options available to minimise this risk.

The aim of the genetic reproductive counselling is to guarantee that the couple has all the necessary information regarding their genetic risk so that they may make informed reproductive decisions.

PRESERVATION OF FERTILITY

An option for women at risk of losing reproductive capacity

Dr. Encarna Martínez

Gynaecologist
UR Cartagena Murcia

The preservation of fertility consists of a set of techniques designed to protect the reproductive capacity of women who are at risk of losing this capacity. Essentially, there are three categories in which fertility may be compromised: social causes, medical causes and oncological causes.

SOCIAL REASONS: Delayed motherhood

One of the most common causes of the loss of fertility is associated with a delay in the age of motherhood. We know that the fertility of women declines after the age of 30, and especially after 35. A 30-year-old woman seeking to fall pregnant has a monthly probability of 20% of achieving this, while at age 40, this figure drops to below 5%. This is owed to the fact that age is the main factor that affects the quantity and quality of oocytes, which not only complicates conception after the age of 35 but also results in an increase in the number of abortions and heightens the risk of chromosome disorders in the fetus.

The data in Spain shows that the average age of women upon giving birth to their first child is 32.7 years and that 40% of births take place in women older than 35. What is more, more births are recorded among women over 40 than in those under the age of 25.

For all of these reasons, it is crucial that women who decide to or are obliged to delay motherhood are able to opt for fertility preservation techniques, which include cryopreservation or the vitrification of oocytes, embryos or ovarian tissue, among other things. In the case of the vitrification of oocytes, ideally, this should be carried out before the age of 35, and it is recommended to vitrify between 10 and 15 eggs to maximise the chances of success.

MEDICAL REASONS: Gynaecological and general diseases that compromise fertility

The vitrification of oocytes is also an option for women facing various pathologies that may affect ovarian function and compromise their fertility. Vitrification is recommended due to medical reasons that include:

1. Gynaecological diseases, such as endometriosis, in which a decrease in ovarian reserve is observed; this decline is even greater if surgery is required. This is why it is convenient to vitrify eggs prior to any related surgical intervention. The same also goes for surgeries for benign gynaecological pathologies, such as dermoid or borderline cysts.

2. General diseases, such as rheumatoid arthritis, lupus, Crohn's disease and ulcerative colitis, which require treatments such as cyclophosphamide or methotrexate, drugs that may negatively affect the ovarian reserve.

3. Chromosomal, genetic or metabolic alterations, such as Turner syndrome, X chromosome translocations, a fragile X carrier and galactosemia may cause premature ovarian failure and a decline in the ovarian reserve. In these cases, the vitrification of oocytes is a recommended option for preserving fertility.

ONCOLOGICAL PROCESSES: Protecting fertility during treatment

4% of women diagnosed with cancer are under the age of 35, with breast cancer representing the highest incidence in this population. Many of these women may overcome the disease and plan on undertaking motherhood once they have recovered. However, chemotherapy and radiotherapy treatments may damage the ovaries and cause infertility. The degree of ovarian failure after these treatments depends on the age of the patient, the type of cancer and the treatment protocol. This is why in oncological processes in women of fertile age, the preservation of fertility is already an integral part of oncological treatment, as it is a safe technique that does not affect survival nor increase the risk of relapse. In these cases, the aim is to obtain a maximum number of oocytes in the shortest time possible, as the patient is in a situation of oncological risk.

Keep in mind:

The vitrification of oocytes for age-based reasons should be carried out before the age of 35.

There are other medical reasons, both gynaecological and general, that may justify the preservation of fertility.

The preservation of fertility is an essential component of oncological treatment in women of fertile age, with the aim of maintaining the possibility of being mothers in the future.

EARLY MENOPAUSE

can I get pregnant?

Dr. Natalia Szlarb

Gynaecologist - UR Vistahermosa Alicante

Early menopause affects approximately 1% of the female population under the age of 40 around the world.

This phenomenon is due to the loss of ovarian function before the age of 40 and may be associated with chromosomal anomalies, autoimmune disorders or genetic or unknown causes. This condition affects ovarian function and triggers symptoms similar to those of traditional menopause, causing infertility.

Early menopause, a disruption that nowadays is also known as premature ovarian failure (POF) or primary ovarian insufficiency (POI), significantly diminishes the likelihood of pregnancy due to a decrease in the ovarian reserve and the production of hormones.

The consequences of the cessation of activity in the ovaries are the following:

- The ovary stops producing oestradiol.
- Periods become irregular and eventually disappear.
- Ovulation does not take place and the ovary stops producing eggs.
- The woman suffers from infertility.

Causes of early menopause

Sometimes it is not possible to determine the causes that have led a woman to suffer from early menopause. This is what is known as idiopathic ovarian failure. The possible causes of premature ovarian failure in women are related to:

Surgeries

Hysterectomy with Adnexectomy in which the ovaries, uterus and Fallopian tubes are removed. The partial removal of an ovary during the treatment of endometriosis or teratoma is also possible.

Genetic alterations,

in women who suffer from Turner syndrome or fragile X syndrome.

Family history,

if the mother or sister of the woman has suffered from early menopause, there is a greater likelihood that it will occur within the same family.

Autoimmune diseases

such as hypothyroidism or rheumatoid arthritis. The immune system produces antibodies against the ovary, which destroys or alters the ovarian reserve.

Exposure to chemical products,

pesticides, alcohol, tobacco, solvents etc...

Viral infections

such as malaria or chickenpox.

Treatments against cancer:

chemotherapy and radiotherapy. Depending on the intensity of these treatments, ovarian failure may be reversible or irreversible.

Diagnosis of early menopause

The first warning sign in women is the disappearance of menstruation or a change in the menstrual cycle. In this case, in order to get to the bottom of the cause of all this, it is highly advisable to visit a gynaecologist for a screening.

Following this, it will be necessary to carry out a blood analysis to assess the patient's hormone profile. Low oestradiol levels and an increase in follicle-stimulating hormone (FSH) will confirm that the woman is suffering from early menopause.

and follicle-stimulating hormone. If confirmed, additional tests can be carried out to identify the cause and evaluate associated risks.

According to the National Cancer Research Centre, there are two types of early menopause: primary and secondary early menopause. The first occurs when the ovaries do not function normally, usually due to surgery, oncological treatments or genetic conditions. Secondary menopause, meanwhile, occurs when the ovaries are healthy but do not receive the appropriate hormonal signals from the brain, often due to problems in the pituitary gland or hypothalamus.

If low levels of oestradiol and an increase in follicle-stimulating hormone are detected, the gynaecologist will be able to diagnose, beyond a shadow of doubt, that the patient is in the process of early menopause.

Suffering from early menopause does not mean that pregnancy cannot be achieved, although it will probably be almost impossible to attain naturally.

> Fortunately, advances in fertility techniques and treatments now allow women with early menopause to fulfil their desire to be a mother.

Symptoms of early menopause

Symptoms of early menopause vary depending on the person. Some women will not experience significant disruptions, while others may undergo menstrual irregularities, infertility or typical symptoms of menopause such as hot flushes and mood swings. Physical or cognitive anomalies associated with Turner syndrome may also appear, as may autoimmune conditions that increase the risk of other diseases.

The diagnosis of early menopause includes pregnancy tests and hormonal assessments to determine the levels of oestrogen

Motherhood with early menopause

In the event of the appearance of any of these symptoms, it is essential to seek out a specialist to carry out an evaluation. Early menopause is one of the causes of infertility that can affect a woman, so it is important to be able to stay in control of any changes, especially if the woman's wish is to fall pregnant.

Performing the diagnosis is simple, as the gynaecologist will first perform a gynaecological screening and assessment, and then a blood test will be carried out to determine the hormone levels present in the patient.

There are options that offer hope to women with early menopause who wish to become mothers:

IN-VITRO FERTILISATION	with egg donation, which is the most effective technique. Eggs from young and healthy donors are used to increase the likelihood of success.
EMBRYO DONATION	Consists of the transfer of embryos that have previously been created and frozen.
VITRIFICATION OF EGGS	When menopause begins and the levels of Anti-Müllerian hormone (AMH) begin to drop, the freezing of eggs with AMH not below 1ng/ml should be considered. The use of frozen oocytes is a highly effective treatment in the event that a woman has to undergo an aggressive treatment that compromises her fertility.
PLATELET-RICH PLASMA (PRP)	This experimental technique involves injecting PRP into the ovaries in an attempt to reactivate the "dormant follicles" and improve ovarian function. This therapeutical approach could represent an encouraging perspective for women who wish to conceive with their own eggs, even if they have experienced early menopause or premature ovarian failure.

Nowadays, thanks to innovative assisted reproduction techniques, motherhood is indeed possible with early ovarian failure. The major scientific advances achieved in the area of reproduction outline effective opportunities, seeing as with cutting-edge techniques and technology, the results achieved put us on a path of constant improvement with the greatest guarantees for mothers and their babies.

PANORAMA

of a patient's first contact with assisted reproduction

Preparing for the journey

Fanny Sánchez

Patient Care - UR Moncloa Madrid

Nobody, absolutely nobody knows what experiencing an assisted reproduction process is like until they themselves are immersed in it.

At the same time, these types of process are so complex and personal that even after a long and intense first-person experience, the perspective obtained is still not enough to reach the limits of the individuality of each case.

In parallel to this, we have access to an immense amount of data, testimonials, different information, in many cases contradictory, as well as a great deal of noise, all jumbled up in an incessant tide that comes in waves, crashing over those who have just discovered that they are "patients" and are now facing the stormy seas that shake them up and set them down on an unsettling, unknown horizon.

The way in which each of these people might describe what they are seeing will depend on many factors, but there are some starting elements that are common to everyone and that may serve as little lighthouses that will help us to keep our bearings. Understanding what is happening to the greatest extent possible is fundamental. It is the work of the medical team to discover the causes and draw up and implement a plan, but this does not mean that the patient should adopt a passive approach.

The first major premise that all patients should never relinquish is: **ASK** What you need to know and only what you need to know.

Obviously a patient does not need to study medicine, or genetics, or nutrition or psychology, nor be an economist or juggle a thousand things. They simply don't need to. But they do need to know what is happening to them, what this thing

they are facing means, to understand the implications, the consequences of their decisions and to be active and decisive in the entire process. For this, they need to have all the information in the most realistic and personalised form possible.

> Let's take a look at these common elements as shown in our table.

People arrive at the shore of reproductive treatments from very specific places. It may be a heterosexual couple that, when it comes to the time to plan their future family, encounter an unexpected obstacle. It may be a couple consisting of two women who will logically need this help to try and get pregnant. It may be a woman with a project of independent motherhood. It may also be people with various diagnosed pathologies who require medical intervention to achieve their reproductive goal.

It is also worth mentioning that there is a growing number of people who plan on becoming mothers or fathers at more advanced ages, a fact that, without being a pathology in and of itself, does constitute one of the main causes of infertility in our model of society.

The place from which each of these people are coming will profoundly shape their experience and their manner of dealing with the process; for example, a couple of two women or people who present a unfavourable diagnosis tend to have already accepted the fact that they will need to turn to assisted reproduction in order to have a baby. In the case of heterosexual couples or independent women, they probably had not considered this option until the appearance of the "obstacle"; this often generates a significant initial shock and the need to accept a series of things that, up until then, were completely foreign to them.

These starting points have their own elements – for one, the cause or reason that leads each person to consult a specialist. The idiosyncrasy of each individual also plays a role; each person's way of being, their state of health and the determining experiences they may have had.

Drawing on our broad and, above all, intense experience with our patients, we have compiled a series of episodes that always occur. Not all of them, and not always with the same weight nor similar nuances, but with a frequency and capacity to paralyse that are worth exploring. When we face our demons head on, they become less scary. When we put a name to problems, that's when the answers appear.

The list of these determining elements could be infinite, but we are going to highlight, in a very general manner, the 7 that occur most frequently and that become most entrenched: The first is getting to know the enemy and having the appropriate tools to fight it. And the second is understanding that it is something that affects many people. It helps to step out of the individual perspective and discover that what is happening to us has also happened to others, which is why we can plan ahead for the situation and, in many cases, avoid or mitigate negative effects.

Once again, information is crucial.

Let's take a look:

- UNCERTAINTY AND LOSS OF CONTROL
- LACK OF KNOWLEDGE AND BUILDING CONFIDENCE
- INCESSANT EXTERNAL BOMBARDMENT
- PERSONAL CIRCUMSTANCES
- OUR OWN AND OTHERS' TABOOS
- SOCIAL PRESSURE
- DECAPITALISATION

In a second article, I will go into detail on the characteristics common to these elements and the tools with which we can equip ourselves in order to get into a good starting point in what, without a doubt, will be the journey of our lives.

The importance of SPERM PREPARATION for in vitro fertilisation

Teresa Rubio

Embryologist - UR La Vega Murcia

Naturally, the sperm must reach the egg in the female reproductive tract. In addition to the motility required to reach the female gamete, biochemical changes must occur in the sperm to enable them to penetrate and fertilise the egg. These changes are what we refer to as sperm capacitation.

In the assisted reproduction laboratory, sperm capacitation is carried out prior to any reproductive technique. Efforts are made to simulate these biochemical changes in vitro, whether performing artificial insemination (AI) or using in vitro fertilisation (IVF), including conventional IVF or intracytoplasmic sperm injection (ICSI). The goal of this technique in the laboratory is to recover the highest number of motile sperm (MOT) from the fresh ejaculate, thereby improving the chances of fertilisation.

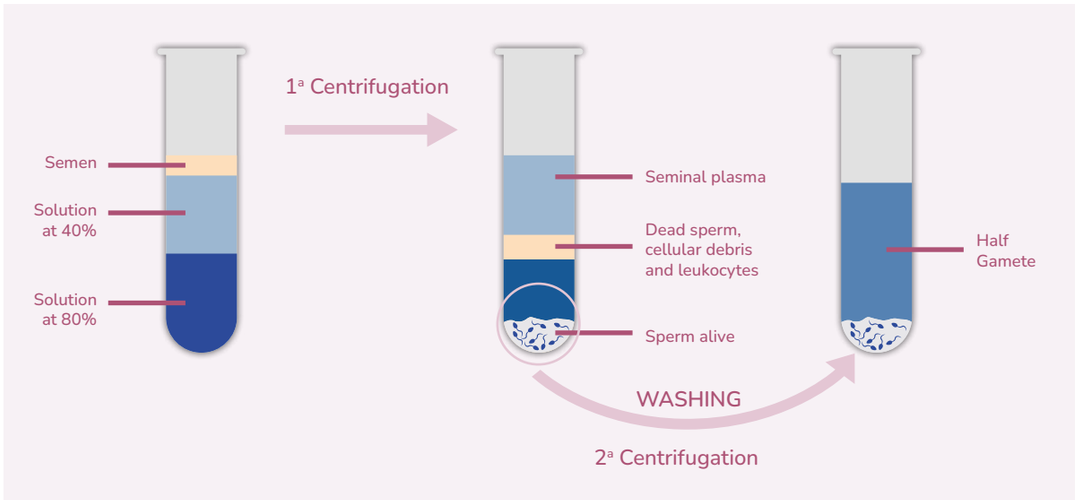
Sperm capacitation is also a diagnostic test that, in conjunction with the semen analysis, helps assess the male's condition prior to any reproductive treatment. The results guide the choice of technique, depending on the motile sperm count (MOT) obtained.

If the motile sperm count (MOT) is equal to or greater than 5 million, artificial insemination could be performed. If it is below 5 million, IVF/ICSI would be recommended, always taking into account the other diagnostic tests of the male and the couple to select the most appropriate treatment.

There are various sperm capacitation techniques, and the choice of method depends on the quality of the sample at the time of processing and the laboratory's assessment.

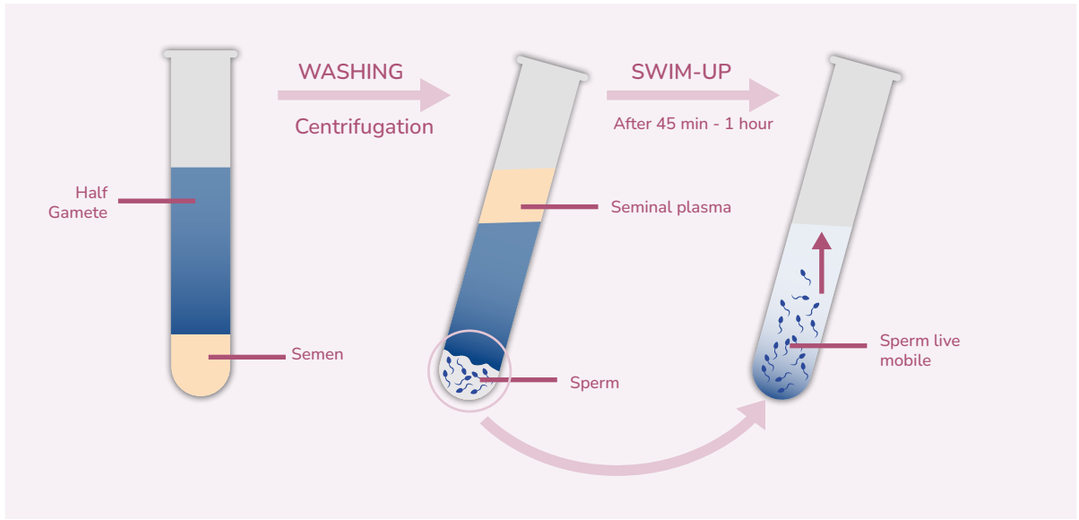
Density gradients

In this technique, media of varying densities are used to impede the movement of sperm. Those with higher motility are able to penetrate through the different layers and reach the bottom. Sperm with the most linear movement pass through the density gradients, from the lowest to the highest, until reaching the bottom of the tube, where they are then collected. This process is assisted by centrifugation for about 25 minutes. After recovering the most motile sperm from the bottom, the sample is washed and subjected to a second centrifugation for 10 minutes, resulting in a final sample ready for any assisted reproduction technique.



Swin-up

In this technique, the semen sample is mixed with culture medium, then centrifuged, resulting in the sperm settling at the bottom while cellular debris remains at the top and is discarded. The obtained sperm are washed with fresh culture medium and incubated for about 40 minutes at 37°C with a 45° incline. The sperm with the best motility swim towards the surface, where they are collected for subsequent use in fertilisation.



Both techniques yield a sample containing sperm with the highest motility and fertilising potential, making them ideal for use in the egg fertilisation process.

At our units within the Grupo Internacional UR, a study was conducted to analyse various laboratory parameters that may influence the sex ratio of newborns (gender at birth) following IVF/ICSI. The factors examined included the type of fertilisation, culture medium, patient age, embryonic morphokinetics and the sperm capacitation method, among others.

It was observed that the sperm capacitation method used – whether density gradients or swim-up – could affect the sex ratio at birth (boy/girl). Efforts are underway to expand the number of cases and data in order to reach more conclusive results.

In addition to sperm capacitation, other more specific sperm selection techniques can be used before in vitro fertilization, particularly when there is a high sperm DNA fragmentation index or to remove apoptotic sperm (those undergoing programmed cell death) from the sample.

> The assisted reproduction specialist will be responsible for recommending these techniques based on the results of the diagnostic tests performed on the male patient and his medical history.

ENDOMETRIAL PLATELET-RICH Plasma (PRP) infusion

Dra. Nuria Castelló
Gynaecologist
UR La Vega Murcia

For successful embryo implantation, a high-quality endometrium is essential.

Ultrasound is the primary technique used today for evaluating the endometrium, assessing its appearance and thickness. However, other factors, such as hormonal levels prior to embryo implantation, are also important. There are occasions when, despite administering various medications, it is difficult to achieve the ideal endometrium. For these cases, a new strategy has emerged involving intrauterine infusion of platelet-rich plasma, known as endometrial PRP.

Platelets contain growth factors, which are proteins that can accelerate tissue healing processes. By activating the platelets with calcium chloride, heparin and ozone, these factors are released into the tissue where the treatment has been applied. This plasma is obtained from the same patient, meaning there is no risk of rejection or side effects, according to current published data.

Recent studies show benefits following the intrauterine application of PRP, primarily in two situations: implantation failure and refractory endometrium. In both cases, it is applied during the endometrial preparation process, with multiple infusions possible before a single transfer to achieve the desired endometrial condition.

In women with implantation failure, these growth factors can enhance endometrial receptivity, and thus improve implantation. It is recommended when pregnancy has not been achieved after multiple embryo transfers using good-quality embryos and a healthy endometrium.

Regarding refractory endometrium, this refers to a situation where, despite the prescribed pharmacological treatment, the endometrium does not reach the optimal thickness required for embryo transfer. In this regard, published studies show that, due to the regenerative potential of platelet growth factors, patients treated with intrauterine PRP experience a thicker endometrium.

In addition to the effects described, PRP has an immunomodulatory action that reduces inflammation, thereby improving the endometrial conditions for embryo transfer.

The infusion technique is **simple and harmless**.

The patient is scheduled for a blood draw at our facility, where the serum components are separated in the laboratory using a centrifuge to obtain the PRP.

The intrauterine infusion procedure **is very similar to an embryo transfer.**

ARTIFICIAL INTELLIGENCE
in assisted reproduction

Dr. Salvador García Aguirre

Medical Director - UR Montpellier Zaragoza

In 1955, John McCarthy coined the term Artificial Intelligence (AI). It began to be developed in the early 1990s. The goal was to create a computer system capable of processing data in a similar way to how the human brain works.

It involves processing large amounts of data with algorithms, mathematical models and pattern recognition, enabling computers to learn independently, make decisions and solve problems by simulating human intelligence, sometimes even surpassing it. Gradually, AI has evolved to become one of the main branches of computer science. Its application helps optimise time, reduce costs and improve outcomes.

The first applications of AI were in the field of medicine. AI involves the collection, storage, analysis and processing of thousands of data points. These data contain sensitive personal information, so it is crucial to implement security measures to ensure their safe handling. AI enhances diagnostic capabilities by establishing relationships between large amounts of biomedical data through the use of algorithms. This helps prevent diagnostic errors and enables real-time predictions. Moreover, it improves treatment efficacy, optimises research timelines and opens new avenues of study that are beyond human logic. Its applications in medicine are numerous, including diagnosing tumours, detecting heart diseases, predicting the risk of psychiatric disorders and more. It can also be used to accelerate the development of new medicines or analyse a patient's genome. AI is emerging as a tool capable of quickly learning and analysing vast amounts of patient history data and scientific advancements, helping professionals provide better diagnoses and treatments.

Applications of AI in Assisted Reproduction

DIAGNOSIS AND SELECTION OF EMBRYOS, improving selection criteria to increase the chances of implantation and successful pregnancy.

Current lines of research in this area include identifying embryos with a higher likelihood of being aneuploid, patients at greater risk of biochemical miscarriage and embryos with higher implantation potential. All of this is achieved by analysing the morphological and morphokinetic parameters of the embryo using time-lapse incubators, with the aim of predicting the embryo's ploidy without the need for a biopsy. Aneuploid embryos seem to display different morphological and morphokinetic parameters, mitochondrial activity and other phenomena, such as embryo contraction. These data can be processed by a computer, allowing for the selection of the best embryo to transfer.

OPTIMISATION OF TREATMENTS, by analysing the results of previous treatments and considering factors such as age, the patient's medical history and laboratory test results.

It allows for greater personalisation of treatments by generating ovarian stimulation protocols. AI can create predictive models based on patient characteristics and their previous treatment cycles. The aim is to personalise reproductive treatment to maximise the chances of pregnancy.

OTHER POTENTIAL APPLICATIONS:

- Result prediction
- Advances in genetic editing
- Fenomach
- Providing more reliable diagnoses based on the analysis of large volumes of data (Big Data).
- Optimising parameters, particularly morphology, in the study of semen.

Diagnostic precision

Although age is one of the main factors in assessing the likelihood of success, there are many other variables that can influence the outcome in one way or another. AI provides both accuracy and a global perspective, making it easier to analyse large volumes of data and patterns. This allows for more efficient decision-making.

In summary, AI has numerous applications in medicine, and specifically in the field of assisted reproduction. It is already being used primarily for semen analysis, treatment optimisation and personalisation, as well as for selecting embryos with the greatest potential for implantation. However, prospective and reproducible studies are still needed to validate the algorithms used in each case, allowing them to be introduced as routine techniques in clinical practice.

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Dr. Salvador García Aguirre
Medical Director

HOSPITAL UNIVERSITARIO HLA

Moncloa

Av. de Valladolid, 83, Moncloa - Aravaca,
28008 Madrid

HLA Grupo Hospitalario

Your pregnancy is our guarantee

UR HLA VISTAHERMOSA

Hospital HLA Vistahermosa
Avda. de Denia, 103, Alicante, 03015, España

+34 965 269 146
+34 615 822 325

INTERNATIONAL DEPARTMENT

Hospital HLA Vistahermosa
Avda. de Denia, 103, Alicante, 03015, España

+34 672 272 961

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www.grupointernacionalur.com
pacientes@grupointernacionalur.com