



EDITORIAL

Ronald T. Burkman, MD

IVF—The Beginning of the Modern Era of Assisted Reproduction

When Robert Edwards, a Cambridge University physiologist, was awarded the Nobel Prize in Physiology or Medicine this past fall, it brought back many memories regarding the evolution of in vitro fertilization (IVF), scientifically and even politically. Despite the accomplishments of many scientists' advances that led to the birth of Louise Brown in 1978, the procedure itself and the science involved were the subject of considerable controversy.

The early researchers faced many challenges. How could they obtain eggs to fertilize? At what stage of embryo development should it be placed in the uterus? What ancillary measures could be used to increase success rates? Would they be able to overcome the objections of various groups to this procedure?

In 1966 work began in earnest when Dr Edwards teamed up with Patrick Steptoe, a gynecologist with an interest in infertility. Dr Edwards perfected a technique to fertilize eggs in the laboratory dish, while Dr Steptoe determined that laparoscopy could be utilized to harvest the eggs.

In the early development of IVF, urinary luteinizing hormone levels were measured frequently to determine when a surge was happening, so that one could harvest an egg via

laparoscopy. Usually only one egg was harvested, sometimes in the middle of the night. Over time, investigators tried various approaches, using ovarian stimulating agents to allow retrieval of more than one egg. Eventually the use of clomiphene to stimulate cycles and

sound guidance. Currently, live-birth rates are approaching 50% after successful transfer in women younger than 35, with lower rates as women age.

Thus, the scientific obstacles were overcome one by one, but some of the political and ethical

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human chorionic gonadotropin to time oocyte maturation resulted in the ability to harvest many suitable oocytes that could be fertilized, cultured, and successfully transferred.

At this time, purified urinary follicle-stimulating hormone is used to stimulate ovulation, sometimes with other agents, with the addition of a gonadotropin-releasing hormone agonist to prevent spontaneous ovulation. Since the mid-1980s, retrieval has been performed transvaginally using ultra-

concerns remain. For example, from the outset, the Catholic Church has been resolute in opposing IVF on the basis that the artificial procreative process was unnatural and interfered with the unitive purpose of marriage. Other opponents expressed concerns that the use of this reproductive technology would result in a society similar to that described in Aldous Huxley's 1932 novel *Brave New World*. As an aside, Huxley's novel was not intended to describe a futuristic society but rather was a parody of many

of the changes in the early 20th century.

In the late 1970s, upon the birth of Louise Brown, Dr Georgianna Seegar Jones and Dr Howard Jones, then faculty members at Eastern Virginia Medical School in Norfolk, expressed interest in establishing an IVF program. Dr Mason Andrews, who chaired the Department of Obstetrics and Gynecology, supported their effort. However, during a hearing to obtain a certificate of need to establish this new program, all 3 were attacked by fundamentalist preachers and pro-life activists who felt the group would experiment on embryos. Through their perseverance, they were eventually able to overcome a number of challenges and establish the first US IVF center at the medi-

cal school. The center's first birth occurred in 1981.

Ethical concerns continue to be raised, including the availability of IVF only for couples of means, the use of IVF after menopause, IVF for same-sex couples, the fate of unused frozen embryos, and the transfer of multiple embryos resulting in higher-order multiples, which fueled the recent "octomom" controversy. From an ethical standpoint, many of these concerns pit a couple's autonomy—respecting their beliefs and values and carrying out their preferences unless there are compelling reasons to the contrary—versus other ethical considerations. For example, if a couple desired to have several embryos transferred (autonomy), it would be in contradistinction to the principle

of beneficence, ie, produce greater clinical good than harm.

Failure to cover the cost of IVF for all couples, regardless of financial status, would be viewed by some as failure of distributive justice, ie, lack of proper allocation of things between different people. However, despite the concerns and opposition, the IVF procedure has flourished, resulting in several million successful pregnancies worldwide in women who previously would have remained infertile.



Ronald T. Burkman, MD
Editor-in-Chief