



MEDICINE

Assisted Reproduction

In the article “Hospital Utilization, Costs, and Mortality Rates during the First 5 Years of Life: A Population Study of ART and Non-ART Singletons,” Georgina Chambers and colleagues analyze whether there are significantly different hospital costs between babies born following assisted reproductive technology (ART) compared with those following non-ART during the first five years of life. They used a population cohort study of children born in Western Australia between 1994 and 2003.¹ Perinatal outcomes, hospital utilization, cost, and mortality were compared between these two groups. In all, 224,425 non-ART babies and 2,199 ART conceived babies were analyzed. The length of stay for ART conceived babies was significantly longer during their birth admission, and there was a 20 percent increased risk of them being admitted during the first five years of their life.

Though the study reflects medical care in an Australian system, it seems reasonable to extrapolate the findings to the US system. As such, based on economic considerations alone, in the current climate of US health care, with emphasis on limiting costs and improving quality, it would seem wise to abandon assisted reproductive technologies.

In this same issue of *Human Reproduction*, another study concerning assisted reproductive technology similarly could be viewed as unfavorable. In their paper, Anette Hansen and colleagues examine whether there is an increased risk of venous thrombosis in women following pregnancy achieved by in vitro

¹ Georgina M. Chambers et al., “Hospital Utilization, Costs, and Mortality Rates during the First 5 Years of Life: A Population Study of ART and Non-ART Singletons,” *Human Reproduction* 29.3 (March 2014): 601–610.

fertilization.² In this Danish study, over 18,000 pregnancies achieved by in vitro fertilization (IVF) were analyzed. The incidence rate of venous thrombosis in these patients was compared with the incidence rate in a reference control population. The incidence rate for venous thrombosis in pregnancies following IVF was 28.6 per 10,000 pregnancy-years compared with 10.7 per 10,000 woman-years. In the IVF pregnancies, the increased rate of venous thrombosis was especially higher in the first trimester and in the first six weeks after delivery. Further, postpartum venous thrombosis risk was higher in multiple IVF pregnancies compared with singleton IVF pregnancies. This study adds more data to the literature for arguments against IVF on the basis of increased health risks associated with assisted reproductive technologies.

Organ Transplantation

In the January issue of *Pediatrics*, Dr. Heather Hanley and colleagues identified all deaths in a neonatal intensive care unit between November 2002 and October 2012 resulting from withdrawal of life-sustaining therapy.³ These patients were then evaluated for their suitability as potential organ donors (donation after circulatory determination of death [DCDD]). Of the patients who died following withdrawal of life-sustaining therapy, fifty-seven were deemed suitable for kidney donation following DCDD. The authors conclude that withdrawal of life-sustaining therapy and using DCDD in neonates may represent a significant source of kidney donation, particularly because brain death in newborns is rare. Like many papers highlighting the scarcity of organs for donation, and therefore the need to expand the pool of organ donation, the moral issue concerns the tension between organ donation as a true act of charity, and the use of a person's body as an object to reach a utilitarian goal. The increasing procurement of organs following DCDD heightens my worry that we are treading in morally perilous waters with regard to the sanctity of the human person.

Futility

In the November 11, 2013, issue of *JAMA Internal Medicine*, Dr. Thanh Huynh and colleagues quantify the prevalence and treatment costs perceived to be futile in critically-ill adult patients.⁴ Recognizing that one of the major limitations in the medical futility literature is a lack of consensus as to the meaning of futility, this study makes its own attempt at achieving consensus on definition. To agree upon a definition of futility, the authors describe use of a focus group of clinicians who care for critically-ill patients. The focus group, comprised of thirteen physicians, was convened to discuss categories of treatments that were deemed futile. Following

² Anette T. Hansen et al., "Increased Venous Thrombosis Incidence in Pregnancies after In Vitro Fertilization," *Human Reproduction* 29.3 (March 2014): 611–617.

³ Heather Hanley et al., "Identifying Potential Kidney Donors among Newborns Undergoing Circulatory Determination of Death," *Pediatrics* 133.1 (January 1, 2014): e82–87.

⁴ Thanh N. Huynh et al., "The Frequency and Cost of Treatment Perceived to Be Futile in Critical Care," *JAMA Internal Medicine* 173.20 (November 11, 2013): 1887–1894.

the group discussions, a survey instrument was created for which a patient could be judged as receiving futile treatment or not, and if receiving futile treatment, the reason for it being judged futile. For example, reasons for judging a treatment to be futile included the burden of treatment grossly outweighing the benefit, the patient never being expected to survive outside of the intensive care unit, the patient being in a state of permanent unconsciousness, inability of treatment to achieve goal, or imminent death.

The survey questionnaire was then administered over a three-month period in five different intensive care units. There were 6,916 assessments of 1,136 patients. Physicians judged that 904 patients never received futile treatment, 98 patients (8.6 percent) received probably futile treatment, and 123 (11 percent) received futile treatment. Eleven patients (1 percent) were perceived to have received futile treatment only on the day that they were transitioned to palliative care and were excluded from analysis. These are the most common reasons for considering a treatment futile: the burdens grossly outweigh the benefits (58 percent), the treatment is ineffective (51 percent), the patient's death is imminent (37 percent), or the patient would not survive outside the ICU (36 percent).

Thirty percent of the patients were permanently unconscious. The mean age of the 1,125 patients was sixty-two years old; 55 percent were men, 75 percent were white, and 17 percent were of Hispanic ethnicity. Compared with the group of patients who were judged as never receiving futile treatment, patients perceived as receiving probably futile or futile treatment were older and had more severe diseases. They also had a longer length of stay, were more likely to have been admitted from an outside hospital, skilled nursing facility, or long-term acute care facility, and were more likely to have received care in the intensive care unit. Age was the strongest patient predictor for being classified as receiving futile treatment. With regard to cost analysis of futile treatment in the ICU, for the 123 patients categorized as receiving futile care, the total hospital costs were \$2.6 million, which was 3.5 percent of the total hospital costs for the 1,136 patients in the study. These data must be interpreted with great care. There are many limitations of the study; for example, data derived from a single center, evaluation of futility based only on one physician's perception, and as noted above, inherent lack of general consensus as to the definition of futility. It will be interesting to see if this paper rekindles discussion about medical futility, similar to what we saw over two decades ago following the Nancy Cruzan case.

Brain Death

Two patients declared brain dead recently attracted national attention, reopening medical, legal, and ethical debates on the brain death criteria. One case involved thirteen-year-old Jahi McMath, who was declared brain dead in December 2013, but whose parents prevented withdrawal of mechanical ventilation from her, insisting that she was not dead. The second case involved Marlise Munoz, who was declared brain dead in November 2013 following a pulmonary embolism and was at the time fourteen weeks pregnant. Her husband wished that she be removed from mechanical ventilation; however, the hospital refused to do so because she was pregnant, citing

a law that required continuation of life-sustaining therapy during pregnancy. In the March 2014 issue of the *Journal of the American Medical Association*, Lawrence Gostin provides a brief analysis of the two cases.⁵ In the March 6, 2014, issue of the *New England Journal of Medicine*, Drs. David Magnus, Benjamin Wilfond, and Arthur Caplan opine on the matter in their article “Accepting Brain Death.”⁶ Both articles include a succinct synopsis of each case and highlight the key points of controversy. Neither, however, seriously engages in the contentious debate over defining death and its determination.

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⁵ Lawrence O. Gostin, “Legal and Ethical Responsibilities following Brain Death: The McMath and Munoz Cases,” *JAMA* 311.9 (March 5, 2014): 903–904.

⁶ David C. Magnus, Benjamin S. Wilfond, and Arthur L. Caplan, “Accepting Brain Death,” *New England Journal of Medicine* 370.10 (March 6, 2014): 891–894.