Final Paper for the National Certification Program in Health Care Ethics

Submitted to Fr. Tad Pacholczyk, National Catholic Bioethics Center

Submitted by Stephanie Gray

July 13, 2009

Why Methotrexate is an Immoral Response to Ectopic Pregnancy

Abstract

With tubal ectopic pregnancies continuing to be a pregnancy complication that results in the unborn dying and even, at times, their mothers, a solution that respects the dignity of the person must be found. Currently there are surgical and medical responses that save the mother's life but not yet the unborn's. An ongoing debate in Catholic circles is whether the administration of the drug methotrexate is an ethical solution to ectopic pregnancy. This paper examines the ethics of this treatment by first considering the science of embryonic development in utero and in the fallopian tube, as well as the mechanisms and uses of methotrexate itself. A discussion then follows that considers concepts such as the immorality of directly killing the innocent, self-defense in the face of an aggressor, suffering evil versus doing evil, the Principles of Totality and Integrity, and The Principle of Double Effect. The conclusion drawn is that methotrexate directly kills the innocent unborn child and is therefore unethical.

Introduction

The problem of ectopic pregnancies is a cause for grave concern. In such pregnancies, the embryo implants outside of the uterine cavity, creating a situation where both the mother's and unborn child's lives are in danger.[1] In fact, ectopic pregnancy is "one of the leading causes of maternal morbidity and mortality in the United States"[2] and accounts "for about four percent of the approximately twenty annual pregnancy-related deaths in Canada."[3] Furthermore, although recently there was a case of an unborn child surviving an abdominal ectopic pregnancy,[4] ninety-seven percent[5] of ectopic pregnancies occur in the fallopian tube where the embryo will not survive. Because tubal ectopic pregnancies are the most common, this paper will focus on them.

The main interventions for this life threatening situation of tubal ectopic pregnancies are as follows: salpingectomy (removing the fallopian tube), salpingostomy (also called salpingotomy: cutting open the tube to remove the pregnancy), and methotrexate (drug treatment).[6,7] This paper will argue that the treatment of methotrexate is unethical. First, it will describe the

---

[1] Charles R. B. Beckmann et al., *Obstetrics and Gynecology*, 5th ed. (Philadelphia: Lippincott Williams & Wilkins, 2006), 161.

[2] John A. Rock and Howard W. Jones, *Te Linde's Operative Gynecology*, 10th ed. (Philadelphia: Lippincott Williams & Wilkins), 798.

[3] Heather Murray et al., "Diagnosis and treatment of ectopic pregnancy," *Canadian Medical Association Journal* 173.8 (October 11, 2005): 905.

[4] CTV.ca News Staff, "Miracle Baby Survives Abdominal Pregnancy," *CTV News*, September 27, 2005, http://www.ctv.ca/servlet/ArticleNews/story/CTVNews/20050926/miracle_baby_050926/20050926?hub=Health (accessed July 9, 2009).

[5] "Medical Management of Ectopic Pregnancy," *ACOG Practice Bulletin: Obstetrics and Gynecology*, 111.6 (June 2008): 1479.

[6] Beckmann et al., *Obstetrics and Gynecology*, 166-7.

[7] There is a fourth response called expectant management, but it is not listed as an "intervention" per se as it doesn't involve action, but instead observation. Expectant management is sometimes the approach taken if it appears the ectopic pregnancy will resolve itself. It may not, however, and so the risk of tubal rupture does threaten the woman: "Distinguishing patients who are experiencing spontaneous resolution of their ectopic pregnancies from patients who have proliferating ectopic pregnancies and require active intervention is difficult" (Ibid., 1483).

development of both intrauterine pregnancies and ectopic tubal pregnancies. Second it will explain the mechanisms and uses of methotrexate. Third, it will provide a moral analysis, showing that methotrexate is unethical because it is direct killing (thereby a case of doing evil rather than suffering evil) and because it does not satisfy the Principle of Double Effect.

Intrauterine Pregnancies and Ectopic Pregnancies Described

Intrauterine Pregnancies Described

In sexual reproduction, fertilization occurs in the fallopian tube. For approximately the next three days, the newly conceived human being travels through the tube toward the uterus.[8] In a pregnancy that is functioning normally, she then makes her way into the uterus and at approximately six days post-fertilization, she attaches to the endometrial epithelium.[9] At this point in pregnancy the unborn child has gone through the zygote and morula stages, and is now called a blastocyst.[10]

During these three stages, the unborn child's body is made up of cells called blastomeres. During the zygote stage, these divide from two to four to eight, etc.[11] By the time the unborn child becomes a morula, twelve to sixteen of these blastomeres form a compact ball. The subsequent blastocyst stage is identified when these blastomere cells form two parts: the trophoblast and the inner cell mass.[12] The inner cell mass is the main body of the embryo, which has a fluid-filled space below it, and together those are surrounded by the trophoblast which will

---

[8] Keith L. Moore, T.V.N. Persaud, and Kohei Shiota, *Color Atlas of Clinical Embryology*, 2nd ed. (Philadelphia: W. B. Saunders Company, 2000), 5.

[9] Keith L. Moore and T.V.N. Persaud, *Before We Are Born: Essentials of Embryology and Birth Defects*, 5th ed. (Philadelphia: W. B. Saunders Company, 1998), 41.

[10] Ibid., 4.

[11] Moore et al., *Color Atlas*, 6.

[12] Ibid.

form the "embryonic part of the placenta"[13] and implant into the uterine wall. The trophoblast also contributes to other extraembryonic support tissues necessary for the unborn child's survival: a future umbilical cord and the amnion, which is the flotation sac the embryo/fetus lives in within the uterus.[14] The embryonic germ layers and maternal endometrium also contribute to these support tissues.[15]

Harvey J. Kliman, of the Yale University School of Medicine, describes the trophoblast as follows:

> When fully developed, the placenta serves as the interface between the mother and the developing fetus. The placental trophoblasts are critical for a successful pregnancy by mediating such critical steps as implantation, pregnancy hormone production, immune protection of the fetus, increase in maternal vascular blood flow into the placenta, and delivery.
>
> As early as three days after fertilization, the trophoblasts–the major cell type of the placenta–begin to make human chorionic gonadotropin (hCG), a hormone which insures that the endometrium will be receptive to the implanting embryo. Over the next few days, these same trophoblasts attach to and invade into the uterine lining… Over the next few weeks the placenta begins to make hormones which control the basic physiology of the mother in such a way that the fetus is supplied with the necessary nutrients and oxygen needed for successful growth. The placenta also protects the fetus from immune attack by the mother, removes waste products from the fetus, induces the mother to bring more

[13] Moore et al., *Before We Are Born*, 45.

[14] Lauren J. Sweeney, *Basic Concepts in Embryology: A Student's Survival Guide* (New York: McGraw-Hill Professional, 1998), 44.

[15] Ibid.

> blood to the placenta, and near the time of delivery, produces hormones that matures the fetal organs in preparation for life outside of the uterus.[16]

In short, the trophoblast (i.e., placenta) is an external body part of the unborn child, which acts as a "middle man" between the unborn child's body proper and her mother. To accomplish its job, trophoblasts are, by nature, very invasive. In fact, if it were not for secretions from the woman's endometrium, trophoblasts would spread throughout the uterus.[17]

Ectopic Pregnancies Described

In the case of tubal ectopic pregnancy, instead of the trophoblasts implanting in the endometrium, they burrow into the fallopian tube. This is a problem because this very narrow tube was not designed to maintain a pregnancy. As a result, there can be rupture and severe internal hemorrhage,[18] which leads to embryonic death and very likely maternal death.

Why do ectopic pregnancies occur? Specific risk factors include these: chronic pelvic inflammatory disease, previous ectopic pregnancy, progestin-only contraceptives, assisted reproductive technologies, multiple sex partners, and developmental tubal anomalies.[19] A theory for why this is the case is because of damage to the structure or the function of the tube.[20] The timeline of an embryo's development is generally constant, but if there is tubal damage, the transport of the embryo can take longer than the normal three days, or her motility can be

---

[16] Harvey J. Kliman, "From Trophoblast to Human Placenta," *Encyclopedia of Reproduction,* December 12, 1998, http://www.med.yale.edu/obgyn/kliman/placenta/articles/EOR_Placenta/Trophtoplacenta.html (accessed June 25, 2009).

[17] Ibid.

[18] Michael S. Baggish and Mickey M. Karram, *Atlas of Pelvic Anatomy and Gynecologic Surgery*, 2nd ed. (Philadelphia: Elsevier Saunders, 2006): Ch. 21.

[19] Rock, *Te Linde's*, 801.

[20] D. Keith Edmonds, ed., *Dewhurst's Textbook of Obstetrics and Gynaecology*, 7th ed. (Massachusetts: Blackwell Publishing, 2007), 107.

obstructed altogether.[21] In such a situation, the embryo's development advances as normal but without the corresponding environmental change, and that can result in the trophoblasts preparing for implantation when the embryo is yet to be in the uterus. It should be pointed out, however, that not all causes of ectopic pregnancy are known. Some have hypothesized that perhaps chromosomal abnormalities of the embryo are a risk factor for ectopic pregnancy, but various studies do not support this.[22]

Methotrexate Explained

Methotrexate is a drug used to treat conditions such as cancer and psoriasis. Its mechanism of action in these cases is to slow the growth of cells: cancer cells in the case of the former, skin cells with regards to the latter.[23] Because of methotrexate's ability to impact cellular growth, it is a candidate for ectopic pregnancy treatment.

But how, exactly, does it impact an ectopic pregnancy? Does it interfere with the growth of the embryo's external body part, the trophoblastic tissue? Does it interfere with the cell growth in the embryo's body proper? Does it interfere with both? Methotrexate's precise mechanism of action on an ectopic pregnancy is not known.[24] What is known is that it affects all rapidly dividing tissues in the body (which is why the conditions some women have make them ineligible for this treatment).[25] One study reported, "Although the exact mechanism of action is

---

[21] Ibid.

[22] Jean Bouyer et al., "Risk Factors for Ectopic Pregnancy: A Comprehensive Analysis Based on a Large Case-Control, Population-based Study in France," *American Journal of Epidemiology* 157.3 (2003): 190, 192.

[23] "Methotrexate," *Medline Plus*, April 1, 2009, http://www.nlm.nih.gov/medlineplus/druginfo/meds/a682019.html (accessed June 30, 2009).

[24] Gary H. Lipscomb et al., "Predictors of Success of Methotrexate Treatment in Women With Tubal Ectopic Pregnancies," *The New England Journal of Medicine* 341.26 (December 23, 1999): 1974.

[25] "Medical Management of Ectopic Pregnancy," 1479–80.

unknown, methotrexate is believed to cause either resorption or tubal abortion of the conceptus."[26]

Methotrexate is not only used on pregnancies that are ectopic. It is used to induce therapeutic abortions on intrauterine pregnancies. One website advocating abortion describes methotrexate as follows:

> In a Methotrexate (MTX) Abortion, it stops embryonic cells from dividing and multiplying and is a non-surgical method of ending pregnancy in its early stages. Within a few days or weeks of receing [sic] an injection of Methotrexate (MTX) at the clinic the, [sic] the pregnancy ends through an experience similar to an early miscarriage.[27]

A Canadian abortion provider whose clinic specializes in medical abortions by combining methotrexate and misoprostol (the latter induces contractions) reported that "Methotrexate is cytotoxic to [the] trophoblast and hence causes abortion…"[28]

Methotrexate is called a folic acid antagonist[29] because it works against folic acid, which bodies use to make new cells.[30] Methotrexate inhibits DNA synthesis and repair[31] and it has

---

[26] Lipscomb et al., "Predictors of Success of Methotrexate," 1974.

[27] "Methotrexate (MTX) for Early Abortion," *Feminist Women's Health Center*, http://www.fwhc.org/abortion/mtxinfo.htm (accessed July 8, 2009).

[28] Ellen R. Wiebe, "Abortion Induced with Methotrexate and Misoprostol," *Canadian Medical Association Journal* 154.2 (January 15, 1996): 166.

[29] Rock, *Te Linde's*, 807.

[30] "Facts about Folic Acid," *Centers for Disease Control and Prevention*, March 31, 2009, http://www.cdc.gov/ncbddd/folicacid/about.html (accessed July 9, 2009).

[31] "Medical Management of Ectopic Pregnancy," 1480.

proven effective in treating gestational trophoblastic disease.[32] In fact, it is because of that latter mechanism that methotrexate was suggested as a treatment for ectopic pregnancy.[33]

In 1998, a study on methotrexate as abortion for intrauterine pregnancies examined whether methotrexate affected the trophoblast or the corpus luteum (a part of the woman which "secretes progesterone… [and] cause[s] the endometrial glands to secrete and prepare the endometrium for implantation of the blastocyst"[34]). This was its conclusion:

> Methotrexate most likely primarily affects trophoblast production of human chorionic gonadotropin, as evidenced by a blunting of the expected increase in serum beta-human chorionic gonadotropin resulting in less support for the production of progesterone by the corpus luteum. However, changes in progesterone levels after methotrexate administration were inconsistent and are unlikely to represent the ultimate effect of methotrexate in abortion. The less-than-normal increase in serum beta-human chorionic gonadotropin levels after methotrexate administration is most likely a result of disruption of cytotrophoblast syncytialization. This disruption may be the true effect of methotrexate in destabilizing the implantation site of an early pregnancy.[35]

That same year another study was done and it also concluded that methotrexate has a significant effect on the trophoblast:

> Our conclusions from this study are that methotrexate acts primarily to derail the normal developmental programme of the trophoblast stem cell population, as well as to decrease

---

[32] Rock, *Te Linde's*, 807.

[33] Liberato V. Mukul and Stephanie B. Teal, "Current Management of Ectopic Pregnancy," *Obstetrics and Gynecology Clinics* 34.3 (September 2007).

[34] Moore et al., *Before We Are Born*, 28.

[35] Mitchell D. Creinin et al., "Methotrexate Effects on Trophoblast and the Corpus Luteum in Early Pregnancy," *American Journal of Obstetrics & Gynecology*, 179.3 (September 1998): 604—609.

> LGL [large granular lymphocyte] cell numbers in the decidua [the woman's endometrium layer that sheds with birth[36]].[37]

Further evidence that methotrexate impacts the trophoblast is that it has been administered following failed salpingostomies. In those cases, not all trophoblastic tissue was removed so it continued to proliferate. Methotrexate was then administered to counteract that.[38]

Interestingly, studies have shown that if methotrexate is administered when there is the presence of an embryonic heartbeat, methotrexate is less efficacious.[39] High hCG and progesterone levels have also been associated with methotrexate failure rates.[40]

A Moral Analysis

The dilemma of an ectopic pregnancy can be summarized this way: A part of the baby (the trophoblast) is doing something it should be doing (implanting) but in a part of the mother it shouldn't be doing it in (the fallopian tube). If nothing is done, the mother and baby will die. If something is done, current technology enables the mother to be saved but not the baby.

Is it ethical to do something? It is only ethical if that something is not evil, as one may not do evil in order to bring about a good.[41] Methotrexate is an immoral means to address this problem because it directly kills an innocent person (thus is an example of doing evil rather than suffering evil) and it does not satisfy the criteria of the Principle of Double Effect.

---

[36] Moore et al., *Before We Are Born*, 123.

[37] Julie A.DeLoia, Ann M.Stewart-Akers, and Mitchell D.Creinin, "Effects of Methotrexate on Trophoblast Proliferation and Local Immune Responses," *Human Reproduction* 13.4 (1998): 1063.

[38] Rock, *Te Linde's*, 808.

[39] Jacque L. Slaughter and David A. Grimes, "Methotrexate Therapy: Nonsurgical Management of Ectopic Pregnancy," *West J. Med* 162.3 (March 1995): 226.

[40] Liberato and Teal, "Current Management of Ectopic Pregnancy."

[41] *Catechism of the Catholic Church: Modifications from the Editio Typica*, trans. United States Catholic Conference, Inc. (New York: Doubleday, 1997), n. 1789.

Directly Killing an Innocent Person

The Catechism of the Catholic Church explicitly condemns killing innocent human beings:

> *Human life is sacred* because from its beginning it involves the creative action of God and it remains for ever in a special relationship with the Creator, who is its sole end. God alone is the Lord of life from its beginning until its end: no one can under any circumstance claim for himself the right directly to destroy an innocent human being.[42]

In Evangelium Vitae, John Paul II relates that teaching to a condemnation of abortion:

> …procured abortion is *the deliberate and direct killing, by whatever means it is carried out, of a human being in the initial phase of his or her existence, extending from conception to birth* …Therefore, by the authority which Christ conferred upon Peter and his Successors, in communion with the Bishops…*I declare that direct abortion, that is, abortion willed as an end or as a means, always constitutes a grave moral disorder*, since it is the deliberate killing of an innocent human being.[43]

The very administration of methotrexate shows how it is deliberate and direct killing: It generally is administered to the woman intramuscularly (or can be given orally).[44] It is given to her body, not to treat a problem with one of her body parts, but in expectation that it will travel through her body *to directly reach the baby's body*. In fact, in some cases methotrexate has been administered directly into the embryo or embryonic/fetal sac.[45,46]

---

[42] *Catechism of the Catholic Church*, n. 2258.

[43] John Paul II, *Evangelium Vitae: On the Value and Inviolability of Human Life* (Washington, DC: U.S. Conference of Catholic Bishops, 1995), n. 58, 62.

[44] Beckmann et al., *Obstetrics and Gynecology*, 167.

[45] Rock, *Te Linde's*, 808.

[46] Stuart H. Shippey et al., "Diagnosis and Management of Hepatic Ectopic Pregnancy," *Obstetrics and Gynecology* 109.2 (February 2007): 545.

Someone may argue that while it is unethical to administer methotrexate into the embryonic sac (because that directly kills the child), giving it intramuscularly directly targets the trophoblast with the *effect* of that being the death of the child.[47]

First of all, there is no evidence that methotrexate distinguishes between the trophoblast and the body proper. In fact, it targets all proliferating cells—which is why some women aren't even candidates for this treatment.[48] Beyond that, however, the trophoblast is an essential organ for the unborn child that happens to be external to the embryo's body. As was described earlier, trophoblasts "are critical for a successful pregnancy"[49] and ensure "the fetus is supplied with the necessary nutrients and oxygen needed for successful growth."[50] So even if methotrexate only targeted that part, it would be immoral. An embryo can survive without, for example, a hand, but she cannot live without the trophoblast. To understand the importance of that body part, consider this: If Person A cuts off the hand of Person B, A is not killing B. But if A cuts out B's heart, then A is killing B. Attacking the trophoblast is analogous to cutting out the heart, not

---

[47] Fr. Albert Moraczewski makes a point along these lines when he says, "Because the trophoblastic cells are rapidly dividing they are affected more quickly and fully than cells of the embryo proper… Once the synthesis of proteolytic enzymes stops (as a result of MTX [methotrexate]), the trophoblastic activity ceases and further damage is prevented. The embryo proper also dies eventually; this is foreseen but not willed as an end or as a means" (, "The Ethics of Treating Ectopic Pregnancy," in *Catholic Health Care Ethics: A Manual for Ethics Committees*, ed. Peter J. Cataldo and Albert S. Moraczewski (Massachusetts: The National Catholic Bioethics Center, 2002), 10B/4.

[48] Methotrexate is not an option for all patients. In fact, women with the following conditions may not be treated by methotrexate: Overt or laboratory evidence of immunodeficiency, Alcoholism, alcoholic liver disease, or other chronic liver disease, Preexisting blood dyscrasias, such as bone marrow hypoplasia, leukopenia, thrombocytopenia, or significant anemia, Known sensitivity to methotrexate, Active pulmonary disease, Peptic ulcer disease, Hepatic, renal, or hematologic dysfunction ("Medical Management of Ectopic Pregnancy," ACOG Practice Bulletin: *Obstetrics and Gynecology* 111.6 (June 2008): 1479).

[49] Kliman, "From Trophoblast to Human Placenta."

[50] Ibid.

cutting off the hand. Because methotrexate "eradicate[s] trophoblastic tissue in an ectopic pregnancy"[51] it directly kills the unborn.

But since the action of the trophoblast and subsequent growth of the unborn child will lead to tubal demise, could administration of methotrexate be viewed as a woman using self-defense against an aggressor? One may even appeal to the Catechism to argue that the action of methotrexate isn't to kill the unborn but to defend one's own life:

> The legitimate defense of persons and societies is not an exception to the prohibition against the murder of the innocent that constitutes intentional killing. 'The act of self-defense can have a double effect: the preservation of one's own life; and the killing of the aggressor… The one is intended, the other is not.'[52]

For that to apply, the unborn would have to be viewed as an aggressor, not an innocent person, because Evangelium Vitae points out that "the killing of innocent human creatures, even if carried out to help others, constitutes an absolutely unacceptable act."[53] The unborn, however, are not aggressors. Due to their level of development, they do not have the ability to choose to do harm. They cannot be anything *but* innocent.

One may counteract that the unborn child may not be consciously choosing to act as an aggressor, but her behavior is nonetheless aggressive. Actually, the unborn child is doing what she should be doing. The growth and development of the trophoblast and subsequent burrowing of the embryo's trophoblast into the mother is a normal part of the development of the unborn and the reproduction of the human species. What is *abnormal* about this situation is the *location* of the pregnancy.

---

[51] Rock, *Te Linde's*, 807.

[52] *Catechism of the Catholic Church,* n. 2263.

[53] John Paul II, *Evangelium Vitae,* n. 63.

This is not the unborn child's fault. As was previously discussed, while the ultimate reason for ectopics is not always known, problems with tubal function or structure are causes of ectopics (which could have even resulted from the mother's lifestyle choices). So it could be said that the baby's body is working correctly; the mother's body is not.

Even in the absence of complete knowledge as to why ectopics occur, it is reasonable to state that just as a woman doesn't directly choose ectopic pregnancy neither does the unborn child. In fact, John Paul II rejected the notion of the unborn child as an aggressor when he said,

> The moral gravity of procured abortion is apparent in all its truth if we recognize that we are dealing with murder and, in particular, when we consider the specific elements involved. The one eliminated is a human being at the very beginning of life. No one more absolutely *innocent* could be imagined. In no way could this human being ever be considered an aggressor, much less an unjust aggressor! He or she is *weak*, defenceless, even to the point of lacking that minimal form of defence consisting in the poignant power of a newborn baby's cries and tears. The unborn child is *totally entrusted* to the protection and care of the woman carrying him or her in the womb.[54]

The presence of the unborn in the fallopian tube does not change who the unborn child is, particularly her innocence, nor does it change the mother's responsibility to protect and care for her own offspring. And yet, the mother also has "the right and duty to protect and preserve [her] bodily and functional integrity."[55] Where these two obligations appear to conflict, one's actions should be guided by the notion that it is better to suffer evil than to do evil.[56]

---

[54] John Paul II, *Evangelium Vitae*, n. 58.

[55] National Conference of Catholic Bishops, *Ethical and Religious Directives for Catholic Health Care Services*, 4th ed. (Washington, CD: U.S. Catholic Conference, Inc., 2001), n. 29.

[56] Diego O. Cuevas, "Hysterectomy with Coerced Abortion: A Case Study in Psychological Coercion," *Ethics & Medics* 33.6 (June 2008): 4.

Suffering Evil Versus Doing Evil

This moral principle is understood with the following analogy: Imagine a woman has been arrested and taken to a concentration camp. She is standing in line holding her child when a guard says to her, "I am going to kill both you and your child; however, if *you* kill your child, I will let you live."

Clearly it would be wrong for the mother to kill her child, even though doing so would stop the guard from killing her. No matter how important it is to preserve one's life, that end may not be achieved by doing evil, namely killing an innocent human being. Even if the woman had other children to care for, that still would not justify her preserving her own life through killing the innocent child in her arms.

If she kills the child, she bears responsibility for the child's death. If the guard kills the child, he bears responsibility for the child's death. In the former, the mother does evil. In the latter, the mother (and child!) suffers evil.

This does not mean, however, that the mother must not respond at all. Just because one may not do evil, it does not follow one should do nothing. As the guard attempts to kill her or the child, the mother may use the amount of force necessary to stop that act of aggression—her action in that case is a good.

While not identical to ectopic pregnancy because with that there is no aggressor, the analogy is nonetheless similar in that two people are in a situation where death awaits them. The unborn child may not be killed to save the mother just as the aforementioned born child may not be killed to save the mother. But just because it is doing evil to administer methotrexate, does not mean there aren't ethical alternatives.

This is where removing the expanding fallopian tube through salpingectomy is a reasonable course of action. First, it is very possible that the tube itself has underlying structural or functional problems that caused the ectopic to begin with, and so it is good to remove that pathological organ. Second, if a non-vital organ is threatening the well being of one's whole body, it is good to remove that organ. The mother can live without the fallopian tube, but in the current state of affairs she cannot live with it (if it bursts). In fact, the Principles of Totality and Integrity support this action in response to ectopics: "A part of the human body may be sacrificed if that sacrifice means continued survival for the whole person."[57,58]

That principle shows how directly targeting the trophoblast is fundamentally different from removing the tube: methotrexate sacrifices part of the baby (the trophoblast) and that *doesn't* result in continued survival for the baby. That is direct killing. So too, as discussed, is it immoral to directly kill the baby for the mother. But to remove the tube is to sacrifice a *part* of the woman in order to have continued survival of the *whole* woman.

But what of the death of the embryo once the fallopian tube is no longer attached to the woman's body? In that case, the child's death would be an effect of a good action. It would be a case of evil suffered rather than evil done. How this is moral and methotrexate is not can be further understood by considering The Principle of Double Effect.

The Principle of Double Effect

At the outset of this principle is the idea that one may never commit evil, no matter how noble her intentions. After all, if a good end is sufficient to rationalize doing evil, where does the line get drawn? And by whose standards? It would be license for anyone to do any wrong if

[57] *Ethical and Religious Directives*, n. 29.

[58] National Catholic Bioethics Center, "Principles of Medical Ethics," *National Certification Program in Health Care Ethics* Module 2-1 (September 2008): 1.

they could just show how good could come from it. To choose to do wrong (even if to bring about a good) is acting contrary to God's laws. As St. Augustine pointed out, sin is "an utterance, a deed, or a desire contrary to the eternal law."[59] Sin is so destructive to humans that Christ died to save humans from its consequences. Sin, therefore, must not be chosen for its own sake or as a means to an end.

What this principle does recognize, however, is that sometimes when we commit good actions, there are both good and bad *effects*.[60] Just as a good end does not make a bad means good, so too does a bad end not make a good means bad. Even then, however, one must be discerning when committing behavior that has a good and bad effect.[61] This principle stipulates a number of conditions that must be met when choosing to do a good behavior has both good and bad effects:

1. The action in itself must be good or indifferent. The action must not be intrinsically evil. In other words, the object of the act must be capable of being ordered to God and to the good of one's neighbor and oneself;
2. The good effect cannot be obtained through the bad effect (because then the end would justify the means). The foreseen beneficial effects must not be achieved by means of the foreseen harmful effects.
3. There must be a proportion between the good and bad effects brought about (e.g. life against life); The foreseen beneficial effects must be equal to or greater than the foreseen harmful effects (the proportionate judgment).

---

[59] *Catechism of the Catholic Church*, n. 1849.

[60] National Catholic Bioethics Center, "Principles of Medical Ethics," *National Certification Program in Health Care Ethics* Module 2-2 (September 2008): 1.

[61] Ibid.

4. The intention of the subject must be directed towards the good effect, and merely tolerate the bad effect. That is, the direct intention of the agent must be to achieve the beneficial effects and to avoid the foreseen harmful effects as far as possible, that is, one must only indirectly intend the harm.
5. Some say there is also a fifth requirement - that there does not exist another possibility or avenue. In other words, no other means of achieving those effects are available.[62]

When one looks at methotrexate (contrasted with salpingectomy) in light of these conditions, it is clear why methotrexate is unethical:

1. As already explained, methotrexate itself is "the directly intended termination of pregnancy before viability."[63] The "sole immediate effect"[64] of this drug which targets a vital external organ (and likely the rest of the body) of the unborn child "is the termination of pregnancy."[65] Therefore, it is intrinsically evil. In contrast, salpingectomy targets the expanding fallopian tube. In other words, the former targets an essential part of the baby's body to save the woman's body. The latter targets the woman's non-essential body *part* to save the woman's body entire.
2. The good effect of the mother not dying is obtained *directly* through the bad action of the child being killed. In contrast with salpingectomy, the good effect of the mother not dying is directly obtained through removing the tube. She isn't saved because the child was killed. She is saved because a part of her was going to burst and kill her and it was

[62] Ibid.

[63] *Ethical and Religious Directives*, n. 45.

[64] Ibid.

[65] Ibid.

removed before doing that. A further indicator that the child's death is an effect with salpingectomy but a means with methotrexate, is when one considers future technological advances. If at some point it becomes possible to save the child, would the current practice of methotrexate leave us with a child to attempt to, for example, resuscitate or re-implant? It does not, because the action itself kills the baby, whereas with salpingectomy, the child lacks a proper environment. It may become possible to transfer her to a safe environment in the future, and with salpingectomy we'd have the body to do that.

3. With salpingectomy there is proportion between the good effect (mother living) and the bad effect (baby dying). With methotrexate, although it is life for life, the significant difference is that the baby dying isn't an effect of a good action but the outcome of an evil action.
4. While in both cases the agent may state his intention is directed towards the good effect of the mother living, and he merely tolerates the child's death, the action of methotrexate betrays this.

When one considers the three sources of the morality of a human act: object, circumstances, and end,[66] it becomes even more clear how methotrexate is immoral but salpingectomy is moral. If any of these three sources of morality are bad, then the act itself is bad; said another way, for the action to be good, all three aspects must be good in themselves.[67] To start with a simple example, reading a textbook (object) during church (circumstances), to prepare for a biology exam (end) is bad because of the circumstances (one should pay attention in church). But

[66] William E. May, *Catholic Bioethics and the Gift of Human Life*, 2nd ed. (Indiana: Our Sunday Visitor Publishing, 2008), 52.

[67] Ibid., 53–4.

reading a textbook (object), on your day off (circumstances), to prepare for an exam (end), is good because all three sources are good. With salpingectomy, removing a non-vital organ (object) when its expansion is threatening the woman's life (circumstances) to save the woman's life (end) is good. Whereas with methotrexate, targeting a vital organ of the innocent unborn (object) when the mother's expanding fallopian tube (that the baby is in) is threatening the woman's life (circumstances) to save the woman's life (end) is wrong because the object involves aborting the pregnancy/killing the child.

Someone may respond that methotrexate would satisfy The Principle of Double Effect if the object of the act were to help the mother, as outlined in guideline forty-seven of the Ethical and Religious Directives:

> Operations, treatments, and medications that have as their direct purpose the cure of a proportionately serious pathological condition of a pregnant woman are permitted when they cannot be safely postponed until the unborn child is viable, even if they will result in the death of the embryo.[68]

But the direct purpose of methotrexate isn't to cure a pathological condition in the pregnant woman (e.g., her fallopian tube); it is to target the baby's vital organ (the trophoblast). Contrast that with a treatment that *would* fall under the aforementioned directive: chemotherapy during pregnancy.[69] If a pregnant woman could die from cancer, it is ethical for her to have chemotherapy treatment even if the chemotherapy will kill the baby.[70]

---

[68] *Ethical and Religious Directives*, n. 47.

[69] This would apply to situations when the unborn child was not yet viable. Otherwise, if the unborn child *was* viable, and the chemotherapy could have a harmful effect on the child, it would be good to induce labour first and provide the unborn treatment in a neonatal intensive care unit.

[70] May, *Catholic Bioethics*, 192.

In that case, cancer is a serious pathological condition of a pregnant woman. And chemotherapy is administered to attack something in her body (cancer) that must be eliminated in order to preserve her whole body. Because the unborn child is also in the woman's body, the child's death is an *effect* of doing a good thing, which is attacking life-threatening cancer.[71] But she isn't saved through the death of her child; after all, if she wasn't pregnant chemotherapy could still save her. Although methotrexate is also a cancer drug, the difference is that it isn't administered to treat a pathology of the woman. By targeting the unborn child's *vital* organ, it is administered—not to harm some*thing* that is inherently harmful—but to harm some*one* who is innocent. So in this case the woman is saved by *means* of the child's death.

Conclusion

Because methotrexate specifically targets the vital organ of the unborn child (and possibly the embryo's body proper) it is therefore killing, direct abortion, and is not moral management for ectopic pregnancy.

It is worth pointing out that this position may be difficult to accept because in rejecting methotrexate, its benefits are lost: It is less invasive than surgery and the patient can be managed on an outpatient basis.[72] Furthermore, because it doesn't remove the fallopian tube, the woman's fertility is preserved (although there is a chance of a subsequent ectopic pregnancy in that tube[73]). But as has been discussed, the ends do not justify the means. The question when considering an action is not, "What is easy or beneficial?" but instead, "What is right?"

Although methotrexate cannot be given to all women, it nonetheless is a common treatment for ectopic pregnancy. Not only do the implications of this paper mean pregnant women should

[71] It should be noted that this would only be done where there isn't another, better, means to address this problem.

[72] Edmonds, *Dewhurst's Textbook,* 111.

[73] Ibid., 107.

reject methotrexate as a form of treatment for ectopic pregnancy, but also that physicians, nurses, and other health care professionals should not participate in the administration of methotrexate. This is certainly a challenging position to hold as it invites criticism. But it also provides an opportunity to witness, teach, and strive for ethical alternatives. As it says in the Ethical and Religious Directives,

> In a time of new medical discoveries, rapid technological developments, and social change, what is new can either be an opportunity for genuine advancement in human culture, or it can lead to policies and actions that are contrary to the true dignity and vocation of the human person… Through science the human race comes to understand God's wonderful work; and through technology it must conserve, protect, and perfect nature in harmony with God's purposes.[74]

[74] *Ethical and Religious Directives*, General Introduction.