Managing Tubal Pregnancies: Part II

This essay must be read together with Part I (Ethics & Medics, June, 1996), which discussed the nature of tubal pregnancy, expectant management, and the ethical aspects of several surgical procedures currently used to manage tubal pregnancies. When ectopic pregnancy is diagnosed very early, some physicians propose methotrexate (MTX), a non-surgical solution. For qualified patients, this treatment, which is not yet the medical treatment of choice, offers:

- minimal side-effects, minimal lost work time, 95% success rates, reproductive outcomes similar to those obtained with surgery, and a cost profile which results in considerable savings when compared with surgical management. (Stovall, "Medical management of ectopic pregnancy," Curr Opinion in Obs & Gyn, 1994, 6: 510-515)

Whatever the clinical merits of MTX, it faces a serious ethical objection, for it appears to bring about a direct abortion. MTX is a drug used in chemotherapy to treat cancer. Before it is given to a woman to treat cancer, she is tested for pregnancy because MTX could be deadly to her child. For this reason most theologians faithful to the Magisterium have rejected the use of MTX to treat ectopic pregnancy. MTX appears to kill the child directly. And, of course, one may not bring about an intended good, no matter how worthy it may be, by evil means such as directly causing the death of a human embryo, i.e., of an innocent person.

But is this a sufficient understanding of the medical facts? What is the basis for saying that MTX directly kills the child? Does it kill the child or does it arrest a destructive activity? Exactly how does MTX function? If certain medical facts were established, it might lead to an acceptance of MTX in certain types of tubal pregnancies. To explore this possibility we must be attentive to the biochemical details of MTX and the context in which this action is taking place.

Process of Normal Uterine Implantation

Normally, about five days after fertilization the blastocyst (preimplantation embryo) has arrived in the uterus and has differentiated into two major portions, the inner cell mass (the embryo proper) and the outer cell mass (the trophoblast, a temporary structure). The blastocyst implants by shedding the zona pellucida (a protective covering) and burrowing into the uterine lining. Here the trophoblast cells secrete protein-digesting enzymes which enable the blastocyst to bury itself in the uterine wall.

The Process of Tubal Implantation

Precise ethical analysis requires examining critically three aspects of a tubal pregnancy: 1) The nature, structure, and function of the tubal site; 2) the activity of the implanting embryo; 3) the manner in which the drug, methotrexate, brings about its effects.

The tube is a seromuscular organ made up of three layers: (from outside to inside) Tunica serosa, Tunica muscularis, and Tunica mucosa. The proper and natural function of the fallopian tube is three-fold: 1) to convey ova from the ovary to the uterine cavity; 2) to transport the sperm from the uterus to the enlarged, upper portion of the tube, where fertilization normally occurs; 3) to transport the newly conceived child to the uterus for implantation.

In a tubal pregnancy, the outer cell mass (trophoblast) attaches to the mucosal layer. It rapidly invades that layer and the muscular layer, and situates itself, generally, between that layer and the outermost layer of the tube. The small size of the tube will not allow full development of the child. Tubal implantation is not only inefficacious, but it is also pathological because it causes injury to the mother and possibly her death.

Action of Methotrexate

MTX interferes with a cell's ability to synthesize DNA by binding to and inactivating a crucial enzyme. DNA stores the genetic information required for synthesis of proteins. And without protein synthesis the cell can no longer grow or divide. In the case of a trophoblastic cell, MTX makes it unable to produce the protein-digesting enzymes necessary for its penetration into the tubal tissue. MTX is most effective against rapidly dividing cells such as cancer cells, hair follicles, and fetal cells (especially trophoblastic cells). One study found that rapidly dividing cells such as cancer cells were at least one thousand times more sensitive to MTX than normal cells. Trophoblastic cells are extremely sensitive to the action of drugs such as methotrexate.

Administration of MTX means the trophoblastic cells can no longer multiply nor produce the enzymes necessary for their proper activity. Clearly, MTX stops further destructive action. But what happens then? It would seem that the tube reabsorbs the tissue:

The process of this therapy [intratubal MTX] is similar to natural healing process of ectopic pregnancy [such as would occur in a successful expectant management] because the MTX selectively suppresses the growth of the trophoblast and induces necrosis; the necrotic tissue is absorbed in the fallopian tube. (Kojima, et al, "Treatment of Unruptured Tubal Pregnancy with Intratubal MTX Injection under Laparoscopic Control," Obs & Gyn, April, 1990, p.725)

Part I of this article noted that expectant management [i.e., doing nothing] often allows the mother's body to heal itself. MTX may assist natural healing by stopping the destructive activity. Thus, after the growth of the trophoblast and its destructive enzymatic activity have ceased, the trophoblast and the embryo will die. The dead tissue is now absorbed by the tube as part of the healing process.

Ethical Analysis

The pivotal ethical issue is to determine whether the interference with DNA synthesis by MTX ultimately constitutes a direct killing of the embryo. It is important at this point to recall that in judging the morality of a human act—that is, one involving appropriate knowledge and free choice—there are traditionally three elements to consider: the intention, the moral object, and the circumstances (all three of which have to be good for the integral act to be morally good).

The circumstances in which the action is chosen and performed are unlimited in number (e.g., the woman’s health, age, etc.). The most relevant circumstance is that the pregnancy is ectopic, i.e., in the abnormal, tubal site (see Part I). The intention—the reason why MTX is used—is to protect the health, life, and reproductive capacity of the woman and not to kill the woman.
child. The moral object in the use of MTX need not be a direct attack on the life of the embryo even if its certain death is foreseen. As noted above, MTX inhibits the synthesis of DNA so that the cell is not able to grow any further and is not able to synthesize the proteolytic enzymes that break down the lining of the tube. Hence, assuming the medical facts recounted above, the use of MTX can be viewed morally as a means to stop the destructive action of the trophoblastic cells. MTX inhibits or stops further activity of the trophoblastic part of the embryo because that activity is injurious to the mother and ultimately to the embryo itself.

The critical point in this analysis is the moral object. To remove any ambiguity here, the term moral object means: "the proximate end of a deliberate decision which determines the act of willing on the part of the acting person" (John Paul II, Veritatis splendor, 78). The moral object is the precise, proximate objective, seen as a good (real or apparent), which is freely chosen in this particular act by the person. It must be carefully distinguished from the intention (with which it is often confused). The intention is the reason why the person wants to intervene with MTX: the moral object is the immediate goal to be achieved by the use of MTX and chosen by the person as contained in the intention.

It may help to contrast the moral object of MTX with that of another medical treatment for the management of tubal pregnancy.

1. Potassium chloride (KCl) injected intratubally will cause cardiac arrest in the embryo. One necessarily wills the death of the embryo.

   moral object: the death of the embryo (the evil willed) by stopping the heartbeat

2. Methotrexate blocks the synthesis of DNA and of the proteolytic enzymes that erode the tubal lining. One chooses to terminate further injury to the mother, but without directly willing the embryo's death.

   moral object: curative inhibition of destructive activity of the trophoblast (the good willed) by stopping DNA synthesis

There is a telling difference in these moral objects, which clearly makes the former a morally unacceptable procedure. The moral object in the use of KCl is necessarily and clearly lethal. Indeed, the primary goal of the means chosen is death: stopping the heart. In contrast, the use of MTX does not necessarily have a lethal intent, even though the death of the embryo is foreseen. Part of the intention is not to kill the child, whose life must be regarded as inviolable, just as much as the life of the mother. The moral object is to stop the destructive trophoblast by stopping further protein synthesis; this is not achieved by killing the trophoblast or the embryo proper. Rather, death follows subsequently.

Clearly, if one used MTX to interfere with normal, uterine implantation, this would be a direct abortion, because it could only be understood as the termination of pregnancy before viability. But in a tubal pregnancy, the trophoblastic implanting process constitutes a life-threatening pathology for the mother. MTX is directed at stopping this pathological process.

**Conclusion: Call for Further Study**

This argument proposes that action can be taken to stop destructive activity because: 1) a tubal pregnancy is an implantation in an abnormal site, such that the child will die before coming to term; and 2) the otherwise normal activity of the trophoblast is injuring the maternal tubal tissue with lethal potential. However, the means chosen must not constitute a direct abortion, whether by intention or by the nature of the action taken. Because MTX acts by interfering with the synthesis of DNA, it can be viewed as having two effects—one good, the other evil. Hence, a person can use MTX to stop the destructive activity of the rapidly growing trophoblast without intending the foreseen death of the embryo. According to available evidence, the eventual death of the trophoblast is not the means by which further growth and proteolytic activity is stopped. Rather, the death of the trophoblast follows eventually upon the cessation of cell division.

The argument proposed above depends on verifying two medical assertions which are not yet satisfactorily documented by experimental data: 1) MTX blocks DNA synthesis, cell division, and proteolytic action in the trophoblast prior to the death of the trophoblast; 2) MTX has these effects before the death of the embryo proper.

I am proposing this argument for discussion and review by competent authority. Should the Magisterium declare that this is not an acceptable position, or if further medical research does not substantiate the medical facts as described and understood in this article, I will withdraw my argument.

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