

After Office Hours

THE EIGHTH-MONTH FETUS: CLASSICAL SOURCES FOR A MODERN SUPERSTITION

Rosemary E. Reiss, MD, and Avner D. Ash, PhD

Among obstetric patients from diverse backgrounds, we found a superstition that the prognosis for preterm infants born at eight months' gestation is poorer than for those born at seven months. After several women on a high-risk inpatient unit spontaneously expressed fears caused by this belief, we investigated its origin. A treatise attributed to Hippocrates is devoted to the idea, which appears to have been current in the Greek world by the fifth century BC. The doctrine was elaborately developed by subsequent Greek physicians and philosophers. It appears in the Talmud and in medieval texts, as well as in early modern medical writings. The unquestioning citation of a dogma of the Ancients until modern times is a common phenomenon in medical history. The persistence of this ancient scientific doctrine as an "old wives' tale" causing inappropriate patient anxiety makes it interesting to the modern obstetrician. (*Obstet Gynecol* 71:270, 1988)

"Old wives' tales" surround pregnancy, often provoking anxiety and questions from patients. We recently

From the Departments of Obstetrics and Gynecology and Mathematics, Ohio State University, Columbus, Ohio.

encountered one that seemed especially puzzling. A young woman from India, hospitalized at 29 weeks for severe chronic hypertension with superimposed pre-eclampsia, wanted to be delivered as soon as possible. Through a translator, she told us, "If you wait longer it will be an eighth-month baby. In our country they say that seventh-month babies survive but eighth-month babies don't." A few days later, an Rh-sensitized woman at 34 weeks requested a fifth intrauterine transfusion to avoid an induction in her eighth month because her German grandmother had taught her that "eighth-month babies" weren't viable.

Shortly thereafter, we heard a Talmudic scholar lecture on the attitude of Jewish law toward scientific advances. He cited opinions among ancient rabbis regarding the nonviability of eighth-month infants. One Talmudic passage allowed desecration of the Sabbath in order to save the life of a seventh-month infant, but forbade it in the case of an eighth-month newborn because the latter was "like a stone."¹ Other passages proposed that surviving eighth-month infants were really seventh-month infants who had tarried past their due date.²

It was difficult for us to imagine any biologic mechanism giving a selective advantage to premature infants born after seven months of gestation as opposed to those of eight months. Intrigued that such an illogical belief should be part of such disparate cultural traditions, we decided to seek its origins. Certainly the belief cannot be supported by modern clinical observation: Survival of premature infants clearly improves with advancing gestational age.^{3,4} This must always have been true. If the superstition had no basis in observation of nature, what could account for its existence and explain its wide geographic distribution? Had it arisen independently in these different cultures or had it diffused from a single place of origin?

A likely source was ancient Greece, because Greek culture was spread as far as India by Alexander the Great, and later by Muslim conquerors, and through Rome was assimilated into Western European thought. The Talmud also drew heavily on Greek science.² The earliest Greek medical writings are found in the Hippocratic corpus, and indeed there is a treatise attributed to Hippocrates called *Peri Oktamenou* (*On the eighth-month fetus*).^{5,6} The author of *Peri Oktamenou* maintains that infants born at eight months' gestation are not viable, whereas those born at seven or nine months can survive. To explain this he elaborates a theory, supposedly based on observation, that both mother and fetus normally undergo a period of 40 days of illness centered around the eighth month of pregnancy (all translations from Greek texts are our own):

The fetus reaches seven months after 182 days plus a fraction . . . Now when it reaches this beginning of its final completion, the fetus is ripening and increasing greatly in strength, more rapidly than at other times. The membranes in which it had been nourished from the start, just like those of ears of wheat, are forced to release before the complete ripening of the fruit. The strongest and ripest of the fetuses, rupturing the membranes, force birth to occur. Most of these die . . . However, a minority of these seven-month fetuses survive, because the manner and timing of their nourishment in the womb was such that these fetuses share all those attributes which even the most mature newborns possess. Also, they come out of the mother before sickening from her illness of the eighth month.

Many fetuses at this age of seven months, when the membranes release, move into the part that gives way and there procure their nourishment. They suffer for the first 40 days (some more than others) because they have moved from their accustomed site of nourishment, because they pull and displace the umbilical cord, and because of the sufferings of the mother. For the stretched membranes and displaced umbilical cord give the mother pain. And the fetus, now released from its former restraints, feels heavier. Many women become feverish when this happens and some even die along with their fetuses . . . Those eighth-month fetuses which are not terribly sick but which undergo the illness in a normal way complete the 40 days generally weakened by these necessary sufferings in the womb but they are born healthy. But if a fetus is born during those 40 days it is impossible for it to survive, since the stresses accompanying birth are superimposed on its illness in the womb.⁵

This doctrine is also mentioned in other works in the Hippocratic corpus, most emphatically in *Peri Sarkon (On fleshes)*.⁷

Two other sources suggest that this idea was current in the fifth century BC. Herodotus recounts a story in which the paternity of the Spartan king Demaratus depends on the possibility that seventh-month fetuses can survive.⁸ The doctrine also appears in two fragments of the pre-Socratic philosopher Empedocles, who was purported to be the founder of a Sicilian school of medicine which rivaled Hippocrates' college in Kos. One fragment gives a numerologic, the other a cosmologic rationale for the phenomenon in question.⁹ Yet an earlier source is Homer's *Iliad*, Book 19, line 118, which refers to the viability of a certain seventh-month fetus.

In any case, from the fifth century BC onward, a belief in nonviable eighth-month infants and viable seventh-month ones was widespread, though not universal, in the ancient world. The idea struck some of the most eminent Greek and Roman scientists and philosophers as surprising and wonderful, and many

other explanations of the phenomenon became current. These included mythologic, numerologic, and astrologic etiologies, besides variants on the physiologic ones. For example, from Galen:

Maxim 450: For what reason are eighth-month fetuses nonviable although the seventh-month fetuses are viable? Thus is it said: that the number eight is even and being joined with itself is not decisive. But the number seven is odd and not joined with itself and therefore decisive.¹⁰

At its most extreme, the theory held that unlike all other animals, humans had not one but two standard periods of gestation, seven and nine months.¹¹ Eighth-month infants who did survive were deemed to be truly seventh-month term infants who lingered past dates in the womb—an irrefutable theory!

For the sake of the honor of ancient scientists, we should point out that some were skeptical. Aristotle (in a fragment preserved by Oribasius, the personal physician of the Roman Emperor Julian) cites some counterexamples, though he seems unwilling to reject outright such a popular doctrine:

There are some who say that eighth-month babies do not live. This is false, for they do live, and this is especially clear in Egypt, because the Egyptians bring up all of their infants . . . But even in Greece, if one looks carefully, one sees that the same holds, so that it is not true that all of the eighth-month babies do not live. However, that few live, indeed fewer than the seventh-month babies and those of a greater number of months, is true.¹²

Again in Book 7, Chapter 14 of his *History of Animals*, Aristotle hints that the disinclination to rear premature infants on account of their high mortality contributed to the belief in their certain death, while those that did somehow survive were merely classified as ninth-month infants.¹³

Others were doubtful besides Aristotle. Pliny remarked that eighth-month infants survived in Italy.¹⁴ The Alexandrian physician Herophilus dismissed the superstition, suggesting that difficulty in counting days since conception played a role in its formation.¹¹ Aetius, a first-century AD doxographer, wrote:

Polybos, Diocles, and the Empiricists say that the eighth-month babies are also viable, but because they are rather weak, many of them die. In general, no one wants to nourish an eighth-month infant, but on the other hand, there are many eighth-month grown men!¹⁵

Despite such skepticism, the doctrine seems to have been accepted by Soranus, the first-century AD Greek

physician who is probably the most famous ancient gynecologist.¹⁶

This belief of the Greek medical schools, so widely discussed in antiquity, was undoubtedly the source of our patients' superstition. We know it flourished in the ancient world, where it is quoted by literateurs and philosophers, usually in order to glorify the number seven.^{11,17-19} The doctrine was transmitted through the medieval period and appears in early modern texts on childbirth. Maimonides, a 12th-century Jewish scholar and one of Saladin's court physicians, repeated the Talmudic doctrine on eighth-month infants without comment.²⁰ The 11th-century Muslim physician and philosopher Avicenna is cited along with Hippocrates in the following passage from *The Sick Womans Private Looking-Glasse*, published in 1636 by John Sadler, "doctor in Physicke at Norwich"²¹:

When the fruite of the womb comes forth before the seventh moneth, (that is before it comes to maturity) it is said to bee abortive. And in effect the child proves abortive (I meane not to live) if it bee borne in the eight moneth. And why children borne in the seventh, and ninth moneths may live and not in the eight moneth, may seem strange yet it is true: The cause hereof by some, is ascribed unto the Planet under which the childe is borne; for every moneth from the conception to the birth is governed by his proper planet: and in the eight moneth, Saturne doth predominate, which is cold and dry, and coldnesse being an enemy unto life, destroys the nature of the childe. Hypocrates gives a better reason: The infant being every way perfect, and compleate in the seventh moneth, desires more aire and nutriment than it had before, which because hee cannot obtaine hee labours for a passage to goe out; and if his spirits bee weake and faynt, and have not strength sufficient to break the membrances and come forth; it is decreed by nature that he should continue in the womb until the ninth moneth, that, in that time his wearied spirits might be againe strengthened and refreshed; but if he returns to strive againe in the eight moneth and bee borne, hee cannot live, because the day of his birth is eyther past or to come; for in the eight moneth, sayeth Avicen hee is weake and infirme, and therefore being then cast into cold ayre his spirits cannot but sinke.

Even so respected a surgeon as the 16th-century Ambroise Pare transmits the doctrine uncritically.²²

How did this implausible dogma originate among the early Greek physicians? One clue comes from the Hippocratean treatise referred to above:

It is necessary not to disbelieve the women concerning childbirth. For they say what they say and always will say, nor can they be persuaded by word or deed that they know anything better than what goes on in their own bodies. Others may say what they like, but the

women decisively and victoriously give the argument that they say and always will say that they give birth to seventh-month and eighth-month and ninth-month and tenth-month and eleventh-month fetuses, and of these the eighth-month do not survive, while the others survive.⁵

Do the ladies protest too much? The story we mentioned in the Herodotus⁸ and a passage in the Jerusalem Talmud cited in Preuss² both suggest that a belief in the viability of the seventh-month fetus could be useful in smoothing over questions of paternity and illegitimacy. Randolph²³ insinuates that Ozark women still used the doctrine for such purposes in the 1940s.

In any case, the doctors learned from the women, who strongly agreed with one another on this point. Where did they get the idea? We can speculate that number mysticism, which informed the number seven with magical powers, helped women explain the occasional survival of premature infants in a world where such survival must have been very rare. Once the viability of seventh-month infants was accepted, the belief in nonviability of eighth-month fetuses could perhaps have arisen as a structural opposition. The same number mysticism may be operating today to perpetuate these beliefs among some of our patients.

There is something practical to be learned from these historic researches. Physicians' uncritical acceptance of biased reporting of empiric evidence by ancient Greek women seems to have created a whole set of fantastic medical theories. As hinted by Aristotle, Aetius, and Oribasius, the doctrine became to some extent a self-fulfilling prophecy in ancient times, because eighth-month infants might not be reared but allowed to die. Premature infants who happened to survive would be deemed seventh-month fetuses, because accurate calculation of dates was and still is so difficult. Although not all the scientists of antiquity believed this dogma, it was adopted into the mainstream of medical thought, where it survived the modernization of that tradition to become once again an "old wives' tale." Since becoming sensitized to the superstition, we have encountered it among diverse groups, including Russian grandmothers, Ozark midwives,²³ and black teenagers. Experienced obstetricians acknowledge often hearing this belief from patients. The superstition that an eighth-month fetus is not viable probably adds to the unspoken fears of many antepartum patients on high-risk units. Eliciting this belief and openly refuting it will reassure some patients and may improve their compliance with medical recommendations.

References

1. Lieberman S (ed): Tosefta Ki-fshutah Part III Order Mo'ed. New York, Jewish Theological Seminary, 1962, pp 245-247

2. Preuss J: Biblical and Talmudic Medicine. Edited and translated by F Rosner. New York, Sanhedrin Press, 1978, pp 393-394
3. Lubchenko LO, Searls DT, Brazie JV: Neonatal mortality rate: Relationship to birthweight and gestational age. *J Pediatr* 81:814, 1972
4. Sinclair JC, Tudehope DI: Birthweight, gestational age and neonatal risk, *Neonatal-Perinatal Medicine*. Edited by AA Fanaroff, RJ Martin. St. Louis, MO, C. V. Mosby, 1983, p 148
5. Joly R (ed): Hippocrates. Vol 11. Paris, Bude, 1970, pp 149-181
6. Grensemann H (ed): Hippocratis, De Octimestri Partu, De Septimestri Partu, *Corpus Medicorum Graecorum*. Vol 1, Part 2, Section 1. Berlin, Akademie, 1968, p 61
7. Littre E (ed): Oeuvres Completes D'Hippocrate. Vol 8. Amsterdam, Hakkert, 1962, p 612
8. Hude C (ed): Herodoti Historiae. Vol 2. Oxford, Oxford University Press, 1966, book VI, chapter 69
9. Diels H, Kranz W (eds): Die Fragmente der Vorsokratiker. Sixth edition, vol 1. Dublin, Weidmann, 1968, p 298
10. Kuhn CG (ed): Claudii Galeni Opera Omnia. Vol 19. Hildesheim, Georg Olms, 1965, p 454
11. Proclus: Commentaire sur la Republique. Vol 2. Translated by AJ Festugiere. Paris, Librairie Philosophique J Vrin, 1970, p 132
12. Bussemaker C, Daremberg H (eds): Oeuvres D'Oribase. Vol 3. Paris, L'Imprimerie Imperiale, 1858, pp 63-65
13. Bussemaker C (ed): Aristoteles Opera Omnia. Vol 3. Hildesheim, Georg Olms, 1973, p 139
14. Rackham H (ed): Pliny. Vol 2, Loeb Classical Library. Cambridge, MA, Harvard, 1961, pp 531-532
15. Aetius: Placita, Doxographi Graeci. Edited by H Diels. Berlin, de Gruyter, 1929, pp 427-428
16. Rose V (ed): Sorani Gynaeciorum. Leipsig, Teubner, 1882, pp 248-249
17. Marache R (ed): Aulu-Gelle. Vol 1. Paris, Bude, 1967, pp 175-181
18. Mangeart MH (ed): Livre de Censorinus sur le Jour Natal. Paris, Panckoucke, 1843, pp 29-51
19. Whitaker H (ed): Philo. Vol 1, Loeb Classical Library. Cambridge, MA, Harvard, 1971, pp 96-152
20. Maimonides, Mishneh Torah, Sefer Ahava: Laws of Circumcision. Chapter 1. Edited by Joseph Kapoch. Jerusalem, Machon Mishnat Ha-Rambam, 1985, pp 12-15
21. Sadler J: The sick womans private looking-glasse. London, 1636 facsimile edition. Norwood, NJ, Walter J. Johnson, 1977
22. Pare A: Oeuvres Completes. Vol 2. Geneva, Slatkine Reprints, 1970, pp 671-672
23. Randolph V: Ozark Magic and Folklore. New York, Dover, 1964, p 202

Address reprint requests to:
 Rosemary E. Reiss, MD
 Department of Obstetrics and Gynecology
 Means Hall, Room 521
 1654 Upham Drive
 Ohio State University
 Columbus, OH 43210

Received June 4, 1987.
Received in revised form July 13, 1987.
Accepted July 17, 1987.

Copyright © 1988 by The American College of Obstetricians and Gynecologists.

5. Naden RP, Iliya CA, Arant BS Jr, Gant NF Jr, Rosenfeld CR. Hemodynamic effects of indomethacin in chronically-instrumented pregnant sheep. *Am J Obstet Gynecol* 1985;151:484-94.

In reply:

I appreciate Dr. Rosenfeld's interest in my article, and I feel he has raised several important points. First, I had stated that several animal studies on a number of different species purported to show that angiotensin II "dilates" the uterine vasculature. This was probably an unfortunate choice of words, because it would be more accurate to conclude from these studies that angiotensin II, at certain doses, increases uterine perfusion (without necessarily dilating the vasculature). I then cited several studies in which angiotensin II appeared to decrease uterine perfusion. Dr. Rosenfeld, citing data from his own laboratory,¹ has offered an explanation that reconciles these opposite findings. He argues that angiotensin II, at all doses studied, increases both the uterine vascular resistance and the mean arterial pressure (MAP). The direction of change in the uterine blood flow resulting from different doses of angiotensin II, therefore, depends on which effect predominates: increased mean arterial pressure (perfusion pressure) or increased uterine vascular resistance. This explanation is certainly plausible and worthy of consideration. In contrast, studies by Ferris and Weir² suggest that the increase in uterine perfusion caused by angiotensin II is not merely the result of increased perfusion pressure (MAP). They demonstrated that the administration of captopril or saralasin to pregnant rabbits decreased uterine blood flow concurrently with a decrease in MAP. Yet, when the MAP was reduced to an even greater degree with magnesium sulfate, uterine blood flow remained unchanged. They concluded that angiotensin II plays an important role in maintaining uterine blood flow, not because of its ability to increase perfusion pressure, but rather because of its ability to induce synthesis of vasodilating prostaglandins in the uterine vasculature.

Second, Dr. Rosenfeld offers evidence, again from his own laboratory,³ that angiotensin II is capable of increasing prostacyclin production by the uterine vasculature. Ferris and Weir² had shown earlier that angiotensin II is capable of increasing prostaglandin E synthesis in the uterine vasculature. Which of these vasodilating prostaglandins is more important physiologically remains to be determined.

Finally, I stated at the end of my paper that it is unclear whether the derangements in prostaglandins seen in preeclampsia represent a primary or secondary phenomenon, and Dr. Rosenfeld echoes these thoughts. Whether the primary cause of preeclampsia

is, for example, immunologic, and the prostaglandins serve merely as mediators, remains to be elucidated.

Steven A. Friedman, MD
Department of Gynecology and Obstetrics
The Johns Hopkins Hospital
600 North Wolfe Street
Baltimore, MD 21205

References

1. Naden RP, Rosenfeld CR. Effect of angiotensin II on uterine and systemic vasculature in pregnant sheep. *J Clin Invest* 1981;68:468-74.
2. Ferris TF, Weir EK. Effect of captopril on uterine blood flow and prostaglandin E synthesis in the pregnant rabbit. *J Clin Invest* 1983;71:809-15.
3. Magness RR, Osei-Boaten K, Mitchell MD, Rosenfeld CR. In vitro prostacyclin production by ovine uterine and systemic arteries. *J Clin Invest* 1985;76:2206-12.

THE EIGHTH-MONTH FETUS: CLASSICAL SOURCES FOR A MODERN SUPERSTITION

To the Editor:

Drs. Reiss and Ash¹ are to be congratulated for their consideration of the origin of the "old wives' tale" relating greater survivability for the seven-month fetus. Many conditions have a firm historic basis, which may arise in folklore or as an early clinical observation. Many diseases, eg, gout or the "sacred illness"—epilepsy—were first described by the ancient Greeks with astute clinical observation.² In the report by Reiss and Ash, the Greek origin of this "old wives' tale" is well established, but rather than an illogical observation, it may in fact represent an accurate clinical observation of the growth-retarded fetus, ie, the small for gestational age (SGA) infant.³ Until recent decades, the survival of small newborns was rare, but the decreased respiratory complications of many growth-retarded infants often permits their survival whereas a larger, normally grown infant may die with respiratory distress syndrome. As the translation from Hippocrates notes: "A minority of these seven-month fetuses survive, because the manner and timing of their nourishment in the womb was such that these fetuses share all those attributes which even the most mature newborns possess." The fetus is smaller (seven-month size) because "the manner and timing of their nourishment in the womb" was abnormal, causing intrauterine growth retardation and an SGA infant.

The assessment of gestational age has always been imprecise, and accurate confirmation has only been available in modern times.⁴ Ancient assessments of gestational age were in all likelihood based only on infant size, and thus the smaller growth-retarded fetus would be considered to have a younger (seven-month) gestational age, whereas the appropriate for gestational age fetus would be larger (eight months), yet would not have had the intrauterine stress of the growth-retarded fetus,⁵ and thus would not have "nourishment in the womb" to provide "all those attributes which even the most mature newborns possess." This ancient medical record is another example of the importance of careful clinical observation in medical practice. It has taken 2500 years to develop the science and technology necessary to explain the basis for this simple, yet important, clinical observation—the SGA infant.

Charles R. King, MD
Department of Obstetrics and Gynecology
University of Kansas
College of Health Sciences
Kansas City, KS 66103

References

1. Reiss RE, Ash AD. The eighth-month fetus: Classical sources for a modern superstition. *Obstet Gynecol* 1988;71:270-3.
2. Lloyd GER, ed. *Hippocratic writings*. New York: Harmondsworth, 1978.
3. Miller HC, Merritt TA. *Fetal growth in humans*. Chicago: Yearbook, 1979.
4. Jones WD, Battaglia FC. Intrauterine growth retardation. *Am J Obstet Gynecol* 1979;127:540-9.
5. Low JA, Galbraith RS, Muir D, Killen H, Karchmar J, Campbell D. Intrauterine growth retardation. *Am J Obstet Gynecol* 1978;130:534-45.

In reply:

We thank Dr. King for his interest in our article and his ingenious suggestion that the phenomenon of intrauterine growth retardation (IUGR) might explain the ancient belief that fetuses born at seven months' gestation were more viable than those born at eight months. As Dr. King notes, the Greek physicians were good clinical observers and certainly capable of developing a concept of growth retardation. However, Hippocrates, in the following passage from *Peri Oktame-nou*, seems to go out of his way to make clear that the seventh-month survivors are not poorly grown:

A proof of the existence of the sufferings of the fetus during the eighth month is the fact that nine month fetuses are born lean compared to their duration of gestation and the length of their bodies. For they have gone through the misery of disease. Not so the seventh

month fetuses which are born fleshed out and nicely plump: they have completed their time in the womb without disease.¹

This graphic portrait of the viable seven-month fetus seems to refute any suggestion that Hippocrates could be trying to describe a growth-retarded infant of low ponderal index.

Furthermore, though small for gestational age infants are much more likely to survive than appropriately grown premature infants of similar weight, their weights fall along a continuum. Why then would not "eighth month" growth-retarded infants have been just as viable as "seventh month" ones?

It is possible that the survival of small for dates infants helped to perpetuate both the belief in the viability of the seven-month fetus and the surprisingly popular concept that humans had two standard periods of gestation, seven and nine months.²⁻⁴ However, the Hippocratic text cited above makes it unlikely that growth retardation was the source of these beliefs. Nor can the phenomenon of IUGR be used to explain the doctrine of nonviability of the eight-month fetus.

Rosemary E. Reiss, MD
Department of Obstetrics and Gynecology
Avner D. Ash, PhD
Department of Mathematics
Ohio State University
Columbus, OH 43210

References

1. Joly R, ed. *Hippocrates*. Vol 11. Paris: Bude, 1970:170.
2. Diels H, Kranz W, eds. *Die Fragmente der Vorsokratiker*. 6th ed, vol 1. Dublin: Weidmann, 1968:298.
3. Proclus. *Commentaire sur la republique*. Vol 2. Translated by AJ Festugiere. Paris: Librairie Philosophique J Vrin, 1970:132.
4. Preuss J. *Biblical and talmudic medicine*. Edited and translated by F Rosner. New York: Sanhedrin Press, 1978:393-4.

ELEVATED MATERNAL SERUM ALPHA-FETOPROTEIN WITH NORMAL ULTRASOUND: IS AMNIOCENTESIS ALWAYS APPROPRIATE?

To the Editor:

Richards et al¹ describe a three-step pregnancy screening program for the identification of neural tube defects. If the first screening test (serum alpha-