Does a Probability of Breech Presentation of More Than 50% Exist Among Diseases and Medical Conditions?

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The aim was to study the effect of twin gestations in a uterus with 2 bodies on the probability of breech presentation at delivery. The hypothesis was that the probability of breech presentation was not higher than 50%. A review was undertaken of MEDLINE (1966–2004) and of the article reference list for statistical analysis of presentation at delivery among twins in a normal uterus, singleton gestations in a uterus with 2 bodies, and case studies of twins in a uterus with 2 bodies. There are 10 studies of twin gestations in a normal uterus (Twin A 3036 cases, breech presentation 22.36%; Twin B 2758 cases, breech presentation 36.87%), 2 studies of singleton gestations in a uterus with 2 bodies (297 cases, breech presentation 42.09%), and 57 case report studies of twin gestations in a uterus with 2 bodies (Twin A 56 cases, breech presentation 14.29%; Twin B 54 cases, breech presentation 18.52%). The odds ratio and chi-square test for differences in probabilities show a significantly lower incidence of breech presentation for twins in a uterus with 2 bodies compared with twins in a normal uterus (Twin A, odds ratio = 0.58; $\chi^2 = 2.08$, $p > .05$, Twin B, odds ratio = 0.39, $\chi^2 = 7.67$, $p < .05$), and singleton gestations in a uterus with 2 bodies (Twin A, odds ratio = 0.23, $\chi^2 = 15.51$, $p < .05$; Twin B, odds ratio = 0.31, $\chi^2 = 10.72$, $p < .05$). Twin gestations in a uterus with 2 bodies decrease the probability of breech presentation.

Currently there are two opposing theories regarding the etiology of breech presentation. The classical, or accommodation theory, states that cephalic and breech presentations result from the correlation between the fetal shape and the intrauterine cavity (Fianu & Václavínková, 1978; Stevenson, 1950). This theory implies that there may be medical entities (i.e., diseases and medical conditions) that are accompanied by breech presentation in all cases. However, no such medical entity exists. The alternative theory states that breech presentation is a random phenomenon. According to this theory, the maximum probability of breech presentation in any condition is 50%, implying that once conditions for breech presentation are established, the fetus will assume either the breech or cephalic presentation with equal probability (Sekulić, 2000; Sekulić et al., 2003).

Several studies published so far have established that no medical entity has more than a 50% probability of breech presentation (Albrechtsen et al., 1998; Braun et al., 1975; Sekulić et al., 2003). However, these studies only tested the probabilities of breech presentation for various single medical entities. The question remains whether the simultaneous presence of several medical entities, each associated with an increased incidence of breech presentation relative to the general population, will result in a greater than 50% incidence of breech presentation. The incidence of breech presentation at birth is around 3% in the general population. Among twins the incidence of breech presentation at delivery is between 20% and 40% (Sekulić et al., 2003). Up to 53% of singleton gestations in a uterus with two bodies are followed by malpresentation at delivery (Acién, 1993). This study examines whether the simultaneous presence of two medical entities, twin pregnancy and a uterus with two bodies, is associated with a greater than 50% incidence of breech presentation.

Method

Data Sources

This study used data published in peer review journals. MEDLINE literature searches were conducted from 1966 to 2004 using the following terms: twin pregnancy, twin delivery, uterus didelphys, uterus subseptate and septate, uterus bicornis–unicollis, and uterus bicornis. From the studies consequently identified, the search was extended to include their

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Table 1
Probability of Breech Presentation for Twin A From a Normal Uterus

Study	Year of publication	Number of cases in study	Probability for breech presentation (%)	95% Confidence interval
Scholtes	1971	200	25.5	19.46–31.54
Langer	1972	354	21.19	16.93–25.44
Curčić	1974	461	23.86	19.97–27.75
Bolte	1978	594	19.53	16.34–22.72
Günthard	1978	255	23.53	18.32–28.74
Mikulandra	1979	241	22.82	17.52–28.12
Maksimović	1988	173	26.59	20.01–33.17
Laros (a)	1988	206	20.39	14.89–25.89
Laros (b)	1988	220	17.73	12.68–22.77
Sekulić	2003	332	25.6	20.90–30.29
Combined	—	3036	22.36	20.87–23.84

reference lists. Identified studies were those with twin gestations in a normal uterus, singleton gestation in a uterus didelphys, uterus subseptate and septate, uterus bicornis–unicollis, and uterus bicornis and case studies of twin gestations in a uterus didelphys, uterus subseptate and septate, uterus bicornis–unicollis, and uterus bicornis. All such studies, which had data regarding fetal presentation at birth for the period that the research of that particular study covered, were included. In twin gestations, first twins were defined as those who were born first. In cases of cesarean section, first twins were those where the cervix was more dilated, the fetal membranes ruptured first, or the twin was in the lower position. If the presentation changed during the interval between deliveries of each twin, the presentation in which the fetus was lying before the first delivery was considered.

Statistical Analysis

Statistical analysis was performed for all cases included with breech or cephalic presentation; oblique and transverse lies were excluded. For Twins A and B from a normal uterus and malformed uterus, as well as a singleton gestation from a malformed uterus, the probability of breech presentation was established, along with the 95% confidence interval. The chi-squared test was used for comparison of the proportion of breech and cephalic presentations from several independent samples for Twins A and B from a normal uterus as well as for singletons from a malformed uterus. The odds ratio was established for breech presentation for Twins A and B in a malformed uterus, compared with Twins A and B in a normal uterus and a singleton gestation in a malformed uterus. The chi-square test for differences in probabilities was also used for comparison of incidence of breech presentation among Twins A from a normal and malformed uterus, Twins B from a normal and malformed uterus, Twins A from a malformed uterus and a singleton gestation from a malformed uterus, Twins B from a malformed uterus and a singleton gestation from a malformed uterus.

Results

A total of 10 series of twin gestations in a normal uterus were identified which fulfilled the inclusion criteria (Bolte, 1978; Ćurčić, 1974; Günthard & Schmid, 1978; Langer, 1972; Laros & Dattel, 1988; Maksimović et al., 1988; Mikulandra et al., 1979; Scholtes, 1971; Sekulić et al., 2003). The difference between the numbers of cases for Twins A and B results from the fact that the Twins B are more likely to take situs obliqus and situs transversus at delivery, and these two situses were excluded from the study. Two series of singleton gestations in a uterus with two bodies were identified which fulfilled the inclusion criteria (Heinonen, 1982; Sekuli´c et al., 2003). Data are show in Tables 1, 2, and 3.

A total of 57 case studies of twin pregnancy in a uterus with two bodies were identified which fulfilled the inclusion criteria (for references see appendix). The diagnosis of malformed uterus was established by hysterosalpingography before or after twin gestation, clinical examination and x-ray during the pregnancy and at birth (indicated because of the twin gestation), routine ultrasound examination during gestation, cesarean section or other surgery. In the case of reference (Aruh et al., 2005) the data on fetus presentation were received though personal communication with the first author of that study. One of these studies had no data regarding presentation of the first twin (Leiberman et al., 1980), and three studies had no data regarding presentation of the second twin (Gerdts, 1967; Nhân & Huisjes, 1983; Tanaka et al., 1988). The incidences of breech presentation with 95% confidence intervals are shown in Table 4.

There is no statistically significant difference in the incidence of breech presentation among studies for the first twin ($\chi^2 = 11.96$, $df = 9$, $p > .05$) and

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Table 2

Probability of Breech Presentation for Twin B From a Normal Uterus

Study	Year of publication	Number of cases in study	Probability for breech presentation (%)	95% confidence interval
Scholtes	1971	193	38.86	31.98–45.74
Langer	1972	337	37.98	32.80–43.16
Curčić	1974	389	32.90	28.24–37.57
Bolte	1978	560	39.46	35.42–43.51
Günthard	1978	244	37.70	31.62–43.79
Mikulandra	1979	234	39.74	33.47–46.01
Maksimović	1988	157	33.12	25.76–40.48
Laros (a)	1988	157	40.76	33.08–48.45
Laros (b)	1988	187	38.50	31.52–45.48
Sekulić,	2003	300	30.67	25.44–35.88
Combined	—	2758	36.87	35.07–38.67

the second twin ($\chi^2 = 12.80$, $df = 9$, $p > .05$), respectively. There is also no statistically significant difference in the incidence of breech presentation among two series of singleton gestations in a uterus with the two bodies ($\chi^2 = 0.03$, $df = 1$, $p > .05$).

The odds ratio for breech presentation is significantly lower for the first twin from a uterus with two bodies compared to that of a first twin from a normal uterus (OR = 0.58). The odds ratio for the second twin is also significantly lower (OR = 0.39). The odds ratio for breech presentation for the first twin from a uterus with two bodies is even lower when compared with a singleton gestation in a uterus with two bodies (OR = 0.23). The odds ratio for breech presentation for the second twin from a uterus with two bodies is also lower when compared with a singleton gestation in a uterus with two bodies (OR = 0.31).

The difference between incidences of breech presentation for Twin A from a normal uterus and a uterus with two bodies, is statistically significant ($\chi^2 = 2.07$, $df = 1$, $p < .05$). This difference was also statistically significant when Twins B are compared ($\chi^2 = 7.67$, $df = 1$, $p < .05$). A statistically significant difference was also present at comparison of incidence of breech presentation of the first twin from a uterus with two bodies with a singleton gestation in a uterus with two bodies ($\chi^2 = 15.51$, $df = 1$, $p < .05$), as well as comparison of the second twin from a uterus with two bodies with a singleton gestation in uterus with two bodies ($\chi^2 = 10.72$, $df = 1$, $p < .05$).

Discussion

This study shows that, on the basis of the published literature, it is possible to determine the probability of breech presentation for the first and second twin, in both the normal uterus and the malformed uterus with two bodies as well as for a singleton gestation in a malformed uterus. The diagnosis of a malformed uterus with twin gestation was established in all cases following medical procedures unrelated to fetal presentation. Thus the incidence of fetal presentation in twin pregnancy in the malformed uterus expresses the probability without bias toward the incidence of either breech or cephalic presentation. The study shows that the combined effects of twin pregnancy and a malformed uterus decreased the incidence of breech presentation.

The malformed uterus is often associated with fetuses that manifest signs of fetal akinesia deformation sequence (FADS). This syndrome is characterized with long bone hypoplasia, short umbilical cords, and arthrogryposis multiplex congenita. All of these deformations occur as a result of restricted fetal movements (Miller et al., 1979). External cephalic version is seldom successful in singleton gestation when the uterus is malformed (Heinonen et al., 1982) implying that the basic reason for breech presentation is a lack of space for the physiologic span of intrauterine movements.

Table 3

Probability of Breech Presentation for Singleton Gestation in a Uterus with Two Bodies

Study	Year of publication	Number of cases in study	Probability for breech presentation (%)	95% confidence interval
Heinonen	1982	148	42.57	34.60–50.53
Sekulic	2003	149	41.61	33.69–49.53
Combined		297	42.09	36.47–47.70

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Table 4

Probability of Breech Presentation for Twin Gestations in a Uterus With Two Bodies

	Total number	Number of cases in cephalic presentation	Number of cases in breech presentation	Probability for breech presentation presentation of cases	95% confidence interval for breech
Twin A	56	48	8	14.29	5.12–23.45
Twin B	54	44	10	18.52	8.15–28.89

Although the lack of intrauterine space in a twin gestation, as in a malformed uterus, may increase the likelihood of breech presentation, twins can still change their presentation by the end of gestation (Divon et al., 1993). There is the possibility of an artificial change in the fetuses' presentation during the delivery of twin gestations in uteruses with two bodies (Barrett, 1934; Torbet, 1966). This suggests that in singleton gestations in uteruses with two bodies, the body of the uterus that does not contain the fetus restricts the expansion of the other uterus which contains the fetus. The decline in frequency of breech presentation among twin gestations in uterus with two bodies is possibly a consequence of the expansion of both uteruses. In this manner, sufficient intrauterine space is generated for the fetuses to change their presentation.

The results of this study support the assumption that a probability of breech presentation of more than 50% does not exist among medical entities. Almost all studies published in the last 15 years regarding breech presentations either address their resultant perinatal morbidity and mortality, or provide guidance in managing their deliveries. It is necessary to direct further research towards a thorough explanation of the causes of breech presentation. That would allow the elimination of the causes of breech presentation at delivery.

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Appendix A

References of 57 case studies of twin pregnancy in a uterus with two bodies which fulfill the inclusion criteria: Agarwal & Dhruv, 1983; Ahram et al., 1984; Aruh et al., 2005; Barrett, 1934; Biega, 1967; Boldyreva, 1965; Bongain et al., 1994; Braitenberg, 1951; Braze, 1943; Brown, 1956; Brown, 1999; Colaco, 1949; Corbet, 1941; Cramer, 1909; Davies, 1989; Dawson & Ainslie, 1958; Dorgan & Clarke, 1956; Gerdts, 1967; Getts, 1967; Green et al., 1961; Haiges et al., 1991; Hochner-Celnikier et al., 1983; Ioffe, 1957; Isaeva, 1957; Jones & Flanagan, 1973; Keisar, 1962; Kekkonen et al., 1991; Kennedy, 1959; Kovács et al., 1973; Kuczynski et al., 1998; Leiberman et al., 1980; Leon, 1956; Lewenthal, et al., 1977; Lichtenegger, 1978; Margolis, 1974; Messalli et al., 1981; Miller, 1961; Mingeot & Keirse, 1971; Moncure, 1939; Muxi et al., 1971; Nalbanski et al., 2001; Nhân & Huisjes, 1983; Petocchi & Golfieri, 1969; Ramos & Imaz, 1937; Rauch, 1938; Sandoval et al., 1967; Tanaka et al., 1988; Theron, 1969; Torbet, 1966; Toulouse, 1956; Tyagi et al., 2001; Vandermolen et al., 1993; Vartan, 1958; Williams, 1953; Woolf, 1965; Zaleski & Gillis, 1978; Zanela, 1935.