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The Definition, Diagnosis, and Management of Growth-Discordant Twins: An International Census Survey

I. Blickstein

Department of Obstetrics and Gynecology, Kaplan Hospital (affiliated to the Hadassah-Hebrew University School of Medicine, Jerusalem), Rehovot, Israel

Abstract. In order to establish a protocol considering the definition, diagnosis, and management of growth-discordant twin gestations, a questionnaire was sent to 96 authors of twin-related obstetric articles. The views of the 61 responders comprise this international census survey. The data suggest that a clear cut-off value for discordancy is still needed; however, the data indirectly supported a two-grade definition, namely, mild ($> 15\%$ and $< 25\%$ birth-weight disparity) and severe ($> 25\%$) growth discordants. Expectant management was advocated by the majority of participants with outpatient follow-up for mild discordants, while severe discordants may preferably be hospitalized. Follow-up should be done by non-stress testing (daily - 2/wk), biophysical profile (1-2/wk), Doppler velocimetry (1/wk - bi-weekly) and sonographic biometry (bi-weekly). The opinions considering termination of pregnancy because of intertwin growth discordancy were divided; however, discordancy per se, was not considered an indication for cesarean delivery. An adapted management flowchart that summarizes the survey's data is presented and may be used as a standard for future investigations.

Key words: Twins, Pregnancy, Delivery management

Growth discordancy in twin gestations denotes intertwin birth weight disparity evident either before or after delivery. The incidence of growth discordancy depends on the definition used and ranges between 4-9 to 19-23 discordants per 100 twin deliveries [1]. The adverse perinatal outcome and the physical and intellectual disadvantage on developmental follow-ups of the smaller as well as of the larger twin of a growth-discordant pair have been repeatedly observed [1]. Some of the predisposing factors for the growth-discordancy phenomenon have been clarified in recent years [2-6]. However, several important issues, including the discriminative birth-weight difference, prenatal means of

diagnosis and surveillance and intrapartum management considerations remain controversial [1]. To ascertain current practice trends among specialists, an international census survey considering growth-discordant twin gestations has been undertaken.

MATERIALS AND METHODS

In order to establish a management protocol for discordant twins, a questionnaire was sent, during the months of February to April 1990, to 96 obstetricians who have published clinical articles on twin pregnancies in the last five years. Since the aim of the study was to assemble the ideas from obstetricians with special interest in twin growth, the participants were selected from the Medline bibliographic database screened for articles related to twins. Articles not directly related to twin growth or written by authors from other specialities were not included. The senior author was selected in all cases and only one questionnaire was sent if several publications appeared from one institution by the same group of workers. The five-year period was chosen to facilitate contact with authors who may have changed their address since the publication of their article.

The survey contained four questions characterizing the participant's practice and eleven questions on the definition, mode of diagnosis, prenatal surveillance and delivery considerations of growth-discordant twins. The answers were evaluated against each other, using Fisher's exact test, in order to find out significant preferences among the replies. Significance was considered at $p < 0.05$.

RESULTS

A total of 96 questionnaires were sent and 61 (63.5%) authors responded. The entries returned from Europe ($n = 7$), Scandinavia ($n = 7$), United Kingdom ($n = 5$), Israel ($n = 2$), Canada ($n = 3$), United States ($n = 33$), Australia and New Zealand ($n = 3$), and South Africa ($n = 1$). The annual birth rate was less than 2000 in 14 (22.9%), 2000-4000 in 23 (37.8%), and more than 4000 in 24 (39.3%) entries. The majority were tertiary centers ($n = 48$, 78.7%), 7 (11.5%) were secondary centers, and 6 (9.8%) had primary obstetric services. Forty-nine (80.3%) institutions were university-affiliated, 9 (14.7%) were nonacademic public hospitals, and 3 (5%) were private services. The majority ($n = 41$, 67.2%) had a twin delivery rate of more than 1%, 19 (31.1%) had 0.5-1%, and one participant did not give his twin delivery rate. Based on these characteristics, the data given below assumingly represent the combined experience of university-affiliated tertiary hospitals that manage annually over 200,000 deliveries, including more than 2000 twins.

Definition of Growth Discordancy

Fifty-five participants (90.1%) used the percent definition of discordancy [1] calculated as the birth-weight difference expressed as percent of the larger twin's birth weight. However, there was no consensus on the cut-off value. Four (6.5%) defined discordancy as $> 10\%$, 9 (14.7%) as $> 15\%$, 22 (36%) as $> 20\%$, and 20 (32.8%) as $> 25\%$. Six (9.8%) did not use the percent definition.

Antenatal Diagnosis of Growth Discordancy

All participants make an effort to establish an antenatal diagnosis of growth discordancy. Forty-four (72.1%) used sonography and 17 (27.9%) used both Doppler velocimetry and sonography to establish the diagnosis. None used Doppler velocimetry alone. The sonographic diagnosis was done by comparing the estimated fetal weights (EFW) of both twins ($n = 35$, 57.4%), 3 (4.9%) compared the abdominal circumferences, one (1.6%) compared the biparietal diameters, none compared the head circumferences, 16 (26.2%) based their sonographic diagnosis on more than one biometric index, 5 (8.2%) on all the above-mentioned indices, and one participant did not state how he established the sonographic diagnosis. The frequency of the modal method (EFW) was not significantly different ($p = 0.07$) when compared to the total of all other sonographic methods, but was significantly more used when compared to each other method (ie, $p < 0.0004$, compared to "more than one biometric fetal index"). Fifty-four (88.5%) evaluated sonographically growth-discordant pairs for the twin-twin transfusion syndrome; 6 (9.8%) did not, and one (1.6%) gave no answer.

Antenatal Management

There seems to be a consensus about expectant management of twin pregnancies complicated with growth discordancy, ($n = 52$, or 85.2%, compared to none in favor of prompt delivery and 9, or 14.7%, that gave no answer). Moreover, out-patient expectant management was significantly ($p < 0.0005$) more advocated compared to hospitalized expectant management ($n = 34$, or 55.7%, and $n = 18$, or 29.5%, respectively). However, 15 participants gave additional comments on their decision for hospitalization that would depend on Doppler velocimetric results ($n = 2$), degree of discordancy ($n = 1$), gestational age ($n = 9$) and multiple other factors ($n = 3$). Furthermore, when grouped into mild (15 to 25%) and severe ($> 25\%$) discordancy, according to the participant's definition, those in the severe grade were evaluated as in-patients significantly more often than the mild grade ($p = 0.045$).

Antenatal Follow-up of Growth-Discordant Twins

Participants were given 5 methods of antenatal fetal evaluation to choose from: sonographic biometry, biophysical profile, Doppler velocimetry, nonstress testing (NST), and oxytocin challenge testing (OCT). In addition, the frequency of these follow-ups was noted. Fifty-six (91.8%) used sonographic biometry: biweekly evaluations were advocated by 30 (53.6%), weekly by 23 (41%), and daily by 3 (5.4%). Five (8.2%) do not perform sonographic biometry at all. A biophysical profile was advocated by 44 (72.1%) participants: 18 (41%) twice weekly, 22 (50%) once weekly, 2 (4.5%) daily, and 2 (4.5%) biweekly. Doppler velocimetry studies were suggested by 31 (50.8) participants: 10 (32.2%) biweekly, 12 (38.7%) weekly, 9 (29.1) twice weekly. Twelve (19.7%) centers do not perform Doppler studies at all. NST was done daily in 7 (13.5%) centers, twice weekly in 32 (61.5%), weekly in 11 (21.1%), and 2 (3.9) biweekly, giving a total of 52 (85.2%) participants that used this method of follow-up. OCT was not done routinely, but 5 participants used it in case of a nonreactive NST. It appears that sonography (weekly to biweekly biometry plus weekly to twice weekly biophysical profile) and the

twice weekly NST were the most frequently used methods ($p < 0.04$, intramethod comparisons) while a consensus frequency of Doppler velocimetry assessments could not be defined. In-patient care (of severe discordancy) was associated with significantly more frequent evaluations compared with out-patient expectant management ($p < 0.05$, for both NST and biophysical profile, $p < 0.04$, for sonographic biometry).

Single fetal death complicating growth-discordant twinning would be managed expectantly by the majority of participants ($n = 44$, 72.1%, $p < 0.03$ compared to prompt delivery [$n = 9$, 14.8%]). Eight participants (13.1%) would consider delivery if several criteria are met including gestational age and the presence of the twin-twin transfusion syndrome.

Delivery Considerations

Thirty participants (49.2%) have considered growth-discordant twins as an indication for termination of pregnancy by either elective cesarean or by induction of labor. However, a similar group ($n = 28$, 45.9%) hold the opposite opinion, and three (4.9%) will consider termination sometimes. The lower limit of gestational age for those considering termination of pregnancy was next evaluated. No limit, provided fetal lung maturity has been established, was advocated by 16 (53.3%); no limit, regardless of lung maturity, was suggested by 2 (6.6%), and 12 (40%) suggested various gestational ages, ranging from 28 to 35 weeks. These data do not permit a conclusion about the preferred gestational age for termination of twin pregnancy complicated by growth discordancy.

The majority ($n = 53$, 86.9%), do not consider growth discordancy per se as an indication for cesarean delivery ($p < 0.01$, compared to 8 participants [13.1%] that hold the opposite opinion).

DISCUSSION

The antepartum diagnosis of intertwin growth disparity is currently available with the advent of sonography and Doppler velocimetry [7-9,11]. In the management of such cases, further investigations and diagnostic interventions may be considered. However, many unanswered questions remained to be clarified before a management protocol could be constructed and clinically tested. Because this study cannot represent the experience of all obstetricians who manage twin pregnancies, but only of those who expressed their view in the recent medical literature, the selection method may have caused the inclusion of biased opinions since these authors probably deal with more severe cases of discordancy. Moreover, the deliberate lack of selection uniformity (ie, SPO members only, sonologists only, etc) may have caused a priori more diversity of opinions and less consensus. Nevertheless, the method enables an overview of worldwide ideas from various centers with different diagnostic and management styles but with a definite potential to establish a state-of-the art protocol for discordant twin growth. The present census survey was intended to reach that goal in spite of the possible selection bias that would create a rather defensive protocol leading to high rates of hospitalizations, evaluations, induced labors and cesarean deliveries. However, the present study suggests a generally conservative attitude towards discordant twins.

The standard definition of growth discordancy is still needed. Currently, it seems that higher degrees of discordancy ($> 20\%$ and $> 25\%$ birth-weight differences) are more frequently used, probably as a direct result of the current accuracy of the sonographic prediction of the actual birth weight. Obviously, less discordants are expected with the higher than with the lower definitions [2], and a higher cut-off level may miss true discordants. To overcome these difficulties, a two-grade definition proposed by Blickstein and Lancet [1], namely, mild (more than 15% and less than 25%) and severe (more than 25%), seems to be a reasonable compromise that may prove clinically effective in dividing discordant pairs into low- and high-risk twin pregnancies. Although the participants were not specifically questioned on the two-grade definition, it was indirectly supported in this study by the different attitude of the participants to the antenatal management and follow-up frequency of growth discordant twins.

The consensus for routine evaluation of growth discordancy points to the need of an acceptable antenatal definition. Most centers use sonography alone or combined with the more advanced technology of Doppler velocimetry for the diagnosis. Intertwin differences in EFW was the sonographic method of choice, although the literature has not yet confirmed its efficacy [10]. It is possible that clinicians are more comfortable in establishing an EFW in spite of the large inherent method error. Reducing the method error of sonography, possibly by measuring comparable fetal indices [7, 11], is expected to enhance the predictivity of the sonographic diagnosis of discordant twin growth. Twin-twin transfusion must also be excluded when discordancy is suggested by the sonographic findings [6].

Expectant management with frequent NST and sonographic evaluations seems to be generally advocated. The higher frequency of out-patient care associated with lower grades of estimated birth-weight differences may suggest that out-patient expectant management is appropriate for mild discordancy, whereas severe cases should be hospitalized. Termination of pregnancy may then be indicated by a specific clinical situation, and preferably by the vaginal route. A relatively frequent alarming sign is the demonstration of increasing discordancy in a given pair, suggesting arrest of growth of the smaller twin. Similarly, arrest of growth of the larger twin must be excluded when decreasing discordancy is noted in a previously severely discordant pair.

Possible discordancy-associated factors as fetal presentation [4] and fetal sex [5] and birth order of the smaller twin [2] were not considered in the present survey.

The data presented in this study were translated into a management flowchart (Figure). Clearly, it was impossible to fit the diversity of opinions into a neat flowchart without several adaptations and some personal bias of the author. It is further emphasized that practitioners must rely on their own evaluation of the literature; however, the flowchart may be used as a standard for further investigations in this relatively frequent but ill-defined and confusely managed prenatal situation.

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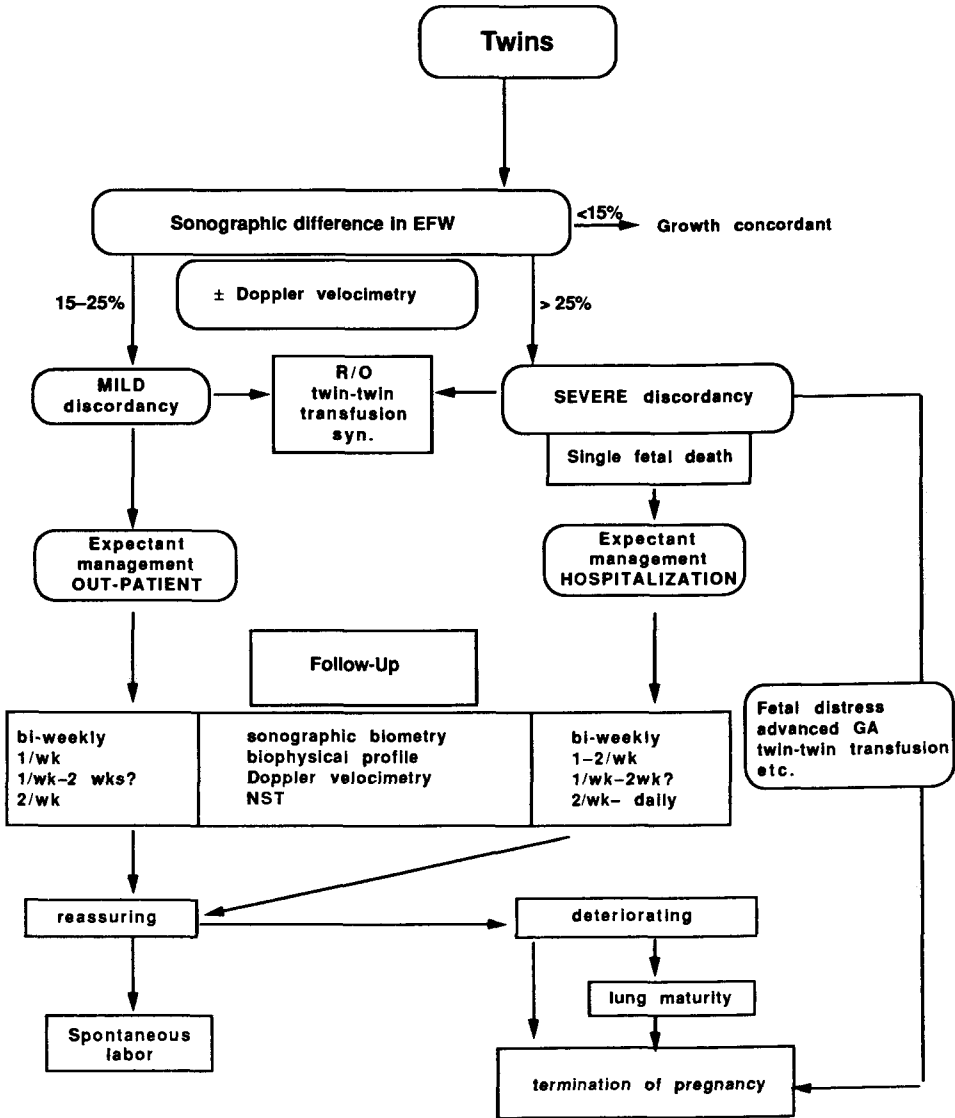


Figure. Flowchart suggesting management of pregnancies complicated by growth discordant twins. EFW: estimated fetal weight, GA: gestational age, NST: non-stress testing.

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Correspondence: Dr. Isaac Blickstein, Department of Obstetrics and Gynecology, Kaplan Hospital, 76100 Rehovot, Israel.