

应用超声探测胎儿股骨长度估计妊娠周数

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了解胎儿在子宫内的生长发育是否符合妊娠周数,对妊娠期的正确处理具有重要的意义。估计妊娠周数的方法有多种,利用超声探测是一种较为准确的方法。妊娠13周前超声测量胎儿顶臀长度,和妊娠26周前测量胎头双顶径均比较准确^[1~2]。但亦有认为在27周后超声测量胎头双顶径的准确度则明显下降。最近,一些学者提出妊娠中期的前半段超声测量胎儿股骨长度可以更准确地推测妊娠周数,并认为在妊娠中期后股骨长度的探测仍然精确^[3~5]。国内此一工作开展尚少。本文对174例孕妇进行181次超声探测胎儿股骨长度以估计妊娠周数,同时测双顶径作对比,所得结果表明妊娠25—40周超声探测胎儿股骨长度可以作为估计妊娠周数的可靠指标。

材 料 和 方 法

正常妊娠孕妇174例月经史均正常,无妊娠合并症。在孕期25—42周进行1—4次超声探测胎儿股骨长度及胎头双顶径,共181次。每例妊娠周数按末次月经计算。每例均为正常足月分娩。新生儿经儿科医生检查确定为足月正常婴儿。新生儿体重在2.5~4.0公斤范围内,低于10%百分位数及高于90%百分位数者则剔除。

超声探测使用 Toshiba Sonolayer SAL—22A型实时线阵扫描仪(探头频率3.5MHz)。全部181例次均由作者等测量,并反复核对结果。双顶径测量方法:选下丘脑水平颅骨显示声像,清楚显示脑中线及左右两旁对称的两条光带后,用电子尺垂直脑中线测量最大外径,

即在头颅光环的一侧线上至另一侧的线上,股骨长度探测方法有二:一是探头与脊椎垂直方向移动至显示股骨声像时,向腹壁方向慢慢转动30°~40°角度,至清楚显示股骨钙化部分全长声像时冻结图像(见照片),用电子尺测量



妊娠39周胎儿股骨声像

其长度;重复测量两次以上,取其最大尺度。二是探头沿脊椎方向纵切移动,至显示股骨声像,然后离腹壁方向慢慢转动40°~60°角度,至清楚显示股骨全长声像时测量,方法同前。按上述方法探测,股骨长度在短时间内即能测得。测出数据,全部用电子计算机经统计学分析处理,用直线回归分析法分析。

结 果

本文数据经统计学分析结果见表一。采用

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直线回归方程求取妊娠周数与股骨长度间的关系, 得出下列公式 (图1):

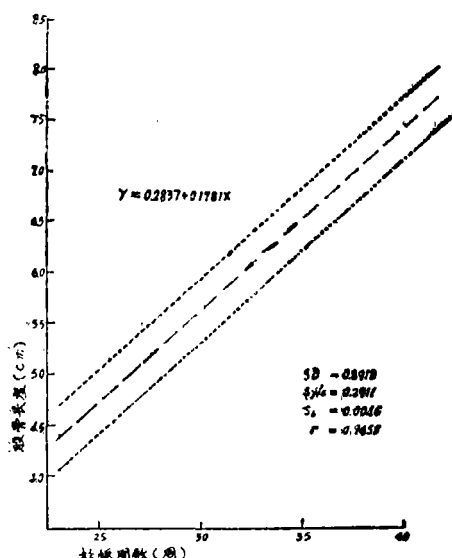


图1. 181例正常胎儿股骨长度(Y)与妊娠周数(X)关系

$$Y = 0.2837 + 0.1781X$$

Y = 股骨长度 (厘米)

X = 妊娠周数 (周)

r (相关系数) = 0.9455

妊娠周数与股骨长度关系见表二, 其回归系数标准估计误差 Sy/x 为 0.2911, 截距 (a) 为 0.2837, 斜率 (b) 为 0.1781, 回归系数标准误 (Sb) 为 0.0046, 计算结果见图 2, 本组数据

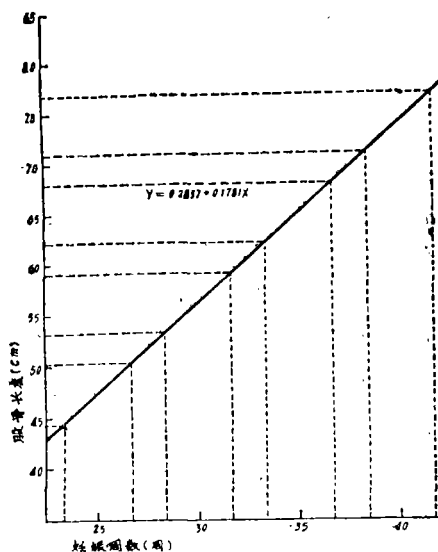


图2. 根据181例正常胎儿股骨长度的最大值和最小值推算出的妊娠周数的可能范围

算得妊娠25~40周间探测股骨长度估计妊娠周数的误差为 ± 11 天 (图2), 各周次间无显著差异。图中妊娠周数两侧虚线指示其最高值和最低值。

表1 妊娠周数与胎儿股骨长度及双顶径的直线回归分析的参数

	妊娠周数与 胎儿股骨长度	妊娠周数与 胎儿双顶径
斜率(b)	0.1781	0.1738
截距(a)	0.2837	2.2777
标准估计误差(Sy/x)	0.2911	0.3729
回归系数标准误(sb)	0.0046	0.0059
相关系数(r)	0.9445	0.9113

讨 论

关于胎儿在子宫内生长发育情况的估计, 至今尚未有满意的方法。Sabbagha等提出在妊娠16周单次测量胎头双顶径估计妊娠周数, 其精确度为 ± 7 天, 27周时增至 ± 14 天, 29—40周时更高达 ± 21 天。

近年 O'Brien^[3]采用测量胎儿股骨长度估计妊娠中期前半段的妊娠周数, 相当准确。Yeh等^[5]探测妊娠16~42周145例股骨长度所得数据与前者相似, 前者妊娠周数与股骨长度相关系数为0.987, 后者为0.9550, 较妊娠周数与双顶径间的关系密切 (后者相关系数为0.3484)。因而提出超声探测胎儿股骨长度适宜作为估计妊娠周数的指标。本文181例次所得结果, 经统计学处理后, 显示妊娠周数与胎儿股骨长度的相关系数为0.9455, 与Yeh等所报告结果甚为接近, 且妊娠周数范围可有25~42周的宽度, 颇为准确与切合实用。本文妊娠周数与胎头双顶径的相关也较密切, 相关系数 (0.9113), 优于文献所述, 但不及股骨长度的测量。股骨长度探测方法较为简易, 声像清晰, 测量容易。而测量胎头双顶经常可因胎头部分衔接入骨盆, 正枕前位及正枕后位, 或臀先露等因素而影响测量的准确性。

本研究结果显示采用超声探测胎儿股骨长度或胎头双顶径, 均有助于准确估计妊娠周

数, 监测胎儿生长发育情况, 适于临床使用。测量股骨长度所得结果似乎更好。二者结合使用, 或者更能准确反映实际情况, 值得作进一步的探讨。

表 2 妊娠周数与股骨长度的预测值及95%置信区间

妊娠周数	预测值 (Y)(厘米)	最高值 (厘米)	最低值 (厘米)
25	4.7356	5.0318	4.4393
26	4.9136	5.2092	4.6180
27	5.0917	5.3867	4.7967
28	5.2698	5.5642	4.9753
29	5.4479	5.7418	5.1539
30	5.6259	5.9195	5.3323
31	5.8040	6.0973	5.5107
32	5.9821	6.2751	5.6890
33	6.1601	6.4530	5.8673
34	6.3382	6.6310	6.0455
35	6.5163	6.8090	6.2236
36	6.6944	6.9871	6.4016
37	6.8724	7.1653	6.5795
38	7.0505	7.3436	6.7574
39	7.2286	7.5219	6.9353
40	7.4067	7.7003	7.1130
41	7.5847	7.8788	7.2907
42	7.7628	8.0573	7.4683

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Ultrasonic Measurement of the Femur Length for Estimation of Fetal Gestational Age

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Abstract

Measurement of the fetal femur length was made with a linear array, real-time ultrasound scanner with freeze-frame and electronic caliper in 171 gravid women from 24-42 weeks' gestation. Fetal biparietal diameter was measured in each case for comparison. Analysis of the data by means of least-square linear regression generated the following equation: $Y = 0.2837 + 0.1781X$ (Y = femur length; X = gestational age). The result showed a high degree of correlation coefficient ($r = 0.9455$) in the relationship between fetal femur length and gestational age which is higher than that between fetal biparietal diameter and gestational age. The relationship between femur length and biparietal diameter is linear with only small variability throughout gestation. Furthermore, it has also shown that ultrasonic measurement of the femur length is highly reproducible within a 2 mm range and real-time equipment has allowed easy measurement of femur length. These results suggest that the ultrasonic measurement of the fetal femur length can be added to those already in use as a sensitive and precise method for estimation of intrauterine fetal growth and development, and is particular in clinical significance as used in association with measurement of the biparietal diameter.