Nutrients and Hormones in Heat-Dried Human Placenta

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Abstract

This cross-sectional study was to assess the nutrients in terms of protein, fat, minerals, and hormones in heat-dried human placenta. Thirty heat-dried human placentas, 15 from male and 15 from female, were analyzed for protein (amino acids), fiber, fat, moisture, minerals (sodium, potassium, phosphorus, calcium, iron, magnesium, zinc, copper, manganese), hormones (estradiol, progesterone, testosterone, growth hormone). Heat-dried female human placentas had slightly higher fiber content than male, but protein and fat components were not different. Mineral levels in placentas were high especially sodium, potassium and phosphorus. There were no significant differences in the amount of minerals and hormonal profile between female and male placentas. However, hormone levels in heat-dried placenta were low compared to physiologic level in human beings. The results of this study suggest that the amount of nutrients particularly protein and minerals in heat-dried human placentas were enriched.

Key word : Nutrient, Hormone, Placenta

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It is believed that bitches and cows eat their own placentas after giving birth in order to be healthy. However, there is no record whether human placentas can be eaten. We have heard that people in the northeastern part of Thailand eat cows' placenta in the belief that it is good medicine. We only know that it has been used in cosmetic industries, especially in Europe, for over 30

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years but the use was much decreased after blood-born diseases especially human immunodeficiency virus have been found.

Human placenta can be used for medical treatment, research and teaching. Several recent reports from both developed and developing countries demonstrated that human placenta components can be used effectively for medical purposes after screening for infectious transmitted diseases. Amniotic membrane is utilized in the treatment of thermal burn and corneal ulcer(1-8). Umbilical cord blood and stem cell can be used for transfusion and transplantation in hematologic diseases(9-12). Umbilical vessels can also be used as a model to practice microsurgery. However, placental cotyledons are still remained. In most countries, including Thailand, burying or incinerating placenta is the common practice in disposing human placentas. However, incineration causes air pollution and costs a lot of money. Studies have shown that fresh placenta is rich in nutrients and hormones such as estrogen, progesterone, androgen, growth hormone, etc(13-15). From our preliminary study, fresh placenta can be transformed to heat-dried powder and free from infectious transmitted diseases(16).

The objectives of this study were to assess the nutrients, i.e. protein (amino acids), fat, minerals (sodium, potassium, ferrous, copper, zinc, magnesium, manganese, phosphorus, calcium), level of sex hormones (estradiol, progesterone, androgen, growth hormone) in heat-dried human placenta.

SUBJECTS AND METHOD

During March 1998, 30 human placentas, 15 male and 15 female, first birth, singleton, term pregnancies were recruited in this study. All babies were delivered by normal vaginal route. All mothers were screened for anti-HIV, hepatitis surface antigen and syphilis. The placentas from mothers with negative tests and without medical or obstetric complications were included in this study. Each placenta was labelled, weighed, recorded and heated in the oven (Memmert®), at temperature 80-100° for 24 hours and then crushed by a blender into powder. Heat-dried placentas were then analysed for protein (Kjeldahl method), fiber (acid-base fiber-filter method), fat (ether extract method), ash (furnace method), moisture (moisture balance followed by hot air oven method), minerals (sodium, potassium, phosphorus, calcium, iron, magnesium, zinc, copper, manganese - atomic absorption spectroscopy)(17), hormones (estradiol, progesterone, testosterone by chemiluminescent enzyme immunoassay and growth hormone by radioimmunoassay)(18). Each heat-dried female and male placenta was randomly selected, hydrolysed and analyzed for amino acid components by high performance liquid chromatography method(17).

RESULTS

Table 1 shows the amount of nutrients in both female and male heat-dried human placenta in terms of moisture, ash, fiber, protein, fat in percentage. There were no significant differences in percentage of ash, protein and fat between female and male heat-dried placentas. Male placentas had more moisture than female's, while female placentas had more fiber than male's. Table 2 depicts the mineral contents as part per million in terms of sodium, potassium, phosphorus, calcium, iron, magnesium, zinc, copper, and manganese. There were no significant differences in the amount of these minerals between female and male placentas.

Table 1. Comparing nutrients in female and male heat-dried placentas.

Nutrients	Female (n = 15)	Male (n = 15)	P value	95% confidence interval
Moisture (%)	6.12 ± 1.14	7.47 ± 1.22	< 0.01	-2.24 - 0.47
Ash (%)	5.74 ± 0.48	5.75 ± 0.33	NS	-0.32 - 0.30
Fiber (%)	0.20 ± 0.02	0.15 ± 0.03	< 0.01	0.03 - 0.07
Protein (%)	81.62 ± 1.29	80.06 ± 1.58	NS	0.49 - 2.64
Fat (%)	1.49 ± 0.36	1.69 ± 0.46	NS	-0.50 - 0.12

Data are presented as mean ± standard deviation
NS - not significant

Table 2. Comparing minerals in female and male heat-dried placentas.

Minerals (ppm)	Female (n = 15)	Male (n = 15)	P value	95% confidence interval
Sodium	10,202.2 ± 1320.7	10,418.0 ± 704.0	NS	-1007.4 - 575.7
Potassium	8,590.9 ± 1020.2	8,367.1 ± 574.9	NS	-395.5 - 843.2
Phosphorus	2,807.0 ± 343.2	2,800.0 ± 410.6	NS	-276.0 - 289.7
Calcium	1,525.8 ± 1302.8	2,287.7 ± 2639.1	NS	-2260.7 - 737.1
Iron	980.0 ± 147.4	1,040.0 ± 154.9	NS	-173.0 - 53.1
Magnesium	373.0 ± 55.6	392.8 ± 59.3	NS	-62.8 - 23.2
Zinc	47.3 ± 11.4	47.0 ± 4.2	NS	-6.1 - 6.7
Copper	41.3 ± 35.6	46.3 ± 26.2	NS	-28.3 - 18.4
Manganese	1.1 ± 0.3	1.3 ± 0.3	NS	-0.34 - 0.05

Data are presented as mean ± standard deviation
ppm = part per million

Table 3. Comparing hormones in female and male heat-dried placentas.

Hormones (ng/g)	Female (n = 15)	Male (n = 15)	P value	95% confidence interval
Estradiol	9.35 ± 3.75	8.49 ± 1.27	NS	-1.2 - 2.9
Progesterone	123.47 ± 39.46	148.27 ± 35.15	NS	-52.7 - 3.1
Testosterone	19.79 ± 7.95	20.71 ± 4.28	NS	-5.7 - 3.9
Growth hormone	3.40 ± 6.76	0.00 ± 0.00	NS	-0.17 - 6.97

Data are presented as mean ± standard deviation

Levels of hormonal profile (estradiol, progesterone, testosterone, growth hormone) are shown in Table 3. There were no significant differences in the levels of hormonal profile between female and male placentas. Levels of amino acids are shown in Table 4. The amounts of each amino acid were comparable between female and male placentas.

DISCUSSION

From the study there was significant difference in the percentage of moisture between female and male heat-dried placentas, which may be due to the processing method during heat-dried procedure. Female placentas had slightly higher fiber contents than male's but protein and fat components were not different. Mineral levels in placentas were also high especially sodium, potassium and phosphorus. However, they were no significant differences in the amounts of these minerals between female and male placentas.

Table 4. Amino acids in heat-dried placentas.

Amino acids	Female (mg%) (n = 1)	Male (mg%) (n = 1)
Aspartic acid	7,116.33	6,873.36
Threonine	3,702.55	3,539.52
Serine	4,105.16	3,839.82
Glutamic acid	9,641.56	9,223.20
Proline	4,217.46	4,048.10
Glycine	5,283.64	5,036.83
Alanine	5,059.04	5,119.72
Cystine	880.24	926.37
Valine	3,828.85	4,001.52
Methionine	373.30	423.99
Isoleucine	1,586.77	1,530.60
Leucine	6,952.75	6,964.15
Tyrosine	2,635.78	2,615.76
Phenylalanine	3,710.00	3,715.27
Histidine	2,815.02	2,826.08
Lysine	5,453.81	5,433.03
Arginine	4,188.08	3,981.75
Tryptophan	622.83	717.29

Levels of hormonal profile were the same in female and male placentas. Compared to the physiologic level in human beings, we found that hormone levels in heat-dried placenta were low. This may be due to the effect of the heating process. Protein content in heat-dried placenta was high (over 80%) and enriched in essential amino acids.

Parts of placenta have been effectively used in many ways in medical practice. Nevertheless, placental cotyledons still remain. This study showed that placental cotyledons were rich in nutrients; particularly protein and minerals. According to the antenatal scheme, we can screen for infectious transmitted diseases such as human immunodeficiency virus, syphilis and viral hepatitis B. The non-infected placentas can be transformed to heat-dried powder and may be utilized as a source of nutrients. This study provides information on the profiles in heat-dried human placenta. Utilization of heat-dried human placenta for non-medical purposes must take into consideration in terms of ethics and social perception.

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สารอาหารและฮอร์โมนในรกอบแห้ง

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รายงานนี้เป็นการศึกษาปริมาณสารอาหารและฮอร์โมนในรกอบแห้ง โดยทำการศึกษาทั้งหมด 30 รก แบ่งเป็นรกของทารกแรกเกิดเพศชาย 15 รก และรกของทารกแรกเกิดเพศหญิง 15 รก โดยศึกษาปริมาณของโปรตีน (กรดอะมิโน), ไฟเบอร์, ไขมัน, ความชื้น, เกลือแร่ (โซเดียม, โปแตสเซียม, ฟอสฟอรัส, แคลเซียม, เหล็ก, แมกนีเซียม, สังกะสี, ทองแดง, แมงกานีส), ฮอร์โมน (เอสตราไดออล, โปรเจสเตอโรน, เทศโทสเตอโรน, โกรทฮอร์โมน) พบว่า รกอบแห้งของทารกแรกเกิดเพศหญิงมีปริมาณไฟเบอร์มากกว่ารกอบแห้งของทารกแรกเกิดเพศชาย ส่วนปริมาณโปรตีนและไขมันไม่แตกต่างกัน ปริมาณเกลือแร่โดยเฉพาะโซเดียม โปแตสเซียมและฟอสฟอรัส มีปริมาณสูง แต่ระดับของเกลือแร่และฮอร์โมนในรกของทารกแรกเกิดเพศชายและหญิงไม่แตกต่างกันและปริมาณฮอร์โมนในรกอบแห้งอยู่ในระดับต่ำเมื่อเทียบกับระดับปกติในร่างกายมนุษย์

การศึกษานี้แสดงให้เห็นว่ารกอบแห้งมีปริมาณสารอาหารโดยเฉพาะโปรตีนและเกลือแร่ในระดับสูง

คำสำคัญ : สารอาหาร, ฮอร์โมน, รก

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