



Study of Various Patterns of Arrangements of Circum Vallate Papillae in Tongues of Human Foetuses

KEYWORDS

Circum Vallate Papillae, Patterns of arrangement, foetuses

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ABSTRACT Background ; Papillae of tongue were recognized as organs of taste. Four types of papillae are present in the Human tongue. In these Circum Vallate Papillae are arranged commonly in the form of "V" but other patterns of arrangement of Circum Vallate Papillae are frequently noted in colour races, hence the present study has been taken up. There is not much data available on the arrangement and number of Circum Vallate Papillae in the human beings particularly in Indians.

Method : 50 dead fetuses were collected from the various maternity hospitals , after fixing these fetuses with formalin, Crown Rump length was measured and age of the fetuses was determined by using that Crown Rump length. Fetuses were arranged according to their gestational age into five groups. By using dissection instruments tongues of the fetuses were taken out by giving incision along the floor of mouth. By using H₂O₂ coating over the tongue was removed, by using hand lens arrangement and number of Circum Vallate Papillae are noted and conclusion was made by using that data.

Result & Conclusion : In the present study Circum Vallate Papillae have been observed at the gestational age of 20 wks and a total number of 7 Circum Vallate Papillae were present in the female fetus in that age group. On an average 9 to 10 Circum Vallate Papillae were counted in the age group from 21 to 40weeks . Circum Vallate Papillae were arranged ,in different patterns. Inverted " V " pattern was observed in 18 male and 16 female fetuses which is the dominant pattern. Inverted " Y " pattern was observed in 3 males and 4 females which is the next dominant pattern after the "V" pattern. Duplication of inverted "V" was observed in 1 male and 2 female fetuses. Inverted "T" pattern was observed in 1 female fetus. Duplication of stem of inverted "Y" was observed in one female fetus. Irregular pattern was observed in 2 male and 2 female fetuses.

INTRODUCTION:

Papillae of tongue were recognized as organs of taste by Lorinzo Bellinis(1665). Schimdt(1959), Blount & Lachman(1953) described smaller variety of fungiform papillae and called them as Lenticular papillae. Both authors described that the "V" shaped arrangement of Circum Vallate Papillae is typical but other patterns of arrangement of Circum Vallate Papillae are frequently noted in coloured races. The present knowledge of structure of different papillae is the result of untiring efforts on the part of many scientists. However, the literature on the development of Circum Vallate Papillae on the tongues of fetuses of different gestational ages is not complete, as far as various patterns of arrangements of Circum Vallate Papillae concerned. Hence the present study has been taken up.

METHOD:

Fifty dead fetuses of 15 to 40 wks gestational age group were collected from government maternity hospitals for present study. In these 24 fetuses were male 26 fetuses were female. All the dead fetuses were infused with 10% formalin solution for preservation of the fetuses. The Crown Rump length of the fetuses were measured and the gestational age was calculated. After dissection of tongues from the oral cavity all the tongues were preserved in 10% formalin. All the tongues were treated with the 10 volumes of Hydrogen peroxide for the removal of any type of coating. By using hand lens Morphometric

data collected.

MORPHOMETRIC DATA regarding

1. Number of Circum Vallate Papillae
2. Distribution
3. Pattern of arrangement:
Inverted "V" pattern,
Inverted "Y" pattern,
Double Row Pattern,
Irregular Pattern,
Any Other Pattern, were noted.

OBSERVATIONS:

Tongues of fetuses of different gestational age groups from 15-40 weeks have been studied for the number and variations in pattern of arrangements of Circum Vallate Papillae. Based on Crown Rump length we have arranged all these fetuses into 5 groups. In the present study Circum Vallate Papillae have been observed at the gestational age of 20 wks and a total number of 7 Circum Vallate Papillae were present in the female fetus in that age group. On an average 9 to 10 Circum Vallate Papillae were counted in the age group from 21 to 40weeks (TABLE NO: 1). Circum Vallate Papillae were arranged ,in different patterns. Inverted " V " pattern was observed in 18 male and 16 female fetuses which is the dominant pattern (TABLE NO: 2 & 3). Inverted " Y " pattern was observed in 3

males and 4 females which is the next dominant pattern after the "V" pattern. Duplication of inverted "V" was observed in 1 male and 2 female fetuses. Inverted "T" pattern was observed in 1 female fetus. Duplication of stem of inverted "Y" was observed in one female fetus. Irregular pattern was observed in 2 male and 2 female fetuses. In 1st group (15-20wks) only one female fetus was present which showed normal "V" pattern (TABLE NO:4). Number of papillae present in this are 7 in number. In 2nd group (21-25wks) 3male and 3 female fetuses were present out of 6 fetuses, 3 showed normal "V" pattern, remaining 3 showed inverted "Y" pattern (TABLE NO:5). In third group (26-30wks) 7 male and 5 female were present out of 12 fetuses 9 showed normal "V" pattern in the remaining 3 fetuses, 2 showed inverted "Y" pattern, 1 showed Irregular pattern (TABLE NO:6). In fourth group (31-35wks) 9male and 9female fetuses were present, in these 13 showed normal "V" pattern, 2 showed Double row pattern, 2 showed Irregular pattern, 1 showed inverted "T" pattern (TABLE NO:7). In fifth group (36-40wks) 5 male and 8 female were present, in these 7 showed normal "V" pattern, 3 showed inverted "Y" pattern, 1 showed double row pattern, 1 showed irregular pattern, 1 showed duplication of stem of "Y" pattern (TABLE NO:8A & B).

DISCUSSION AND CONCLUSIONS:

Most of the Authors gave description of various types of papillae, more so about Circum Vallate Papillae [Arey et al (1937), J.C.B. Grant (1958)⁸, Ernest Garner⁴, Donald J Grey Rohan O's orahily (1963), I.S.L. lovdeen (1956), Western D Gardner¹¹ and Williams A Obner (1972), W.J. Hamilton (1976)¹⁰]. Vastala Swamy (1986) made a morphometric analysis of human Fungiform Papillae and Circum Vallate Papillae.

The diameter of Circum Vallate Papillae ranged from 0.5 mm to 5mm according to Arey et al (1971) and he also reported a variation of 1 to 3 mm in the diameter of Circum Vallate Papillae. Whereas in present study width varied from 1 to 11 mm in formalin hardened tongues. Vastala swamy et al (1986) quoted a free surface area maximum of 20.8mm² to a minimum of 0.35mm².

In the male foetuses total number of Circum Vallate Papillae varied from 6-14. In the female foetuses total number

of Circum Vallate Papillae varied from 7-14. Vastalaswamy et al (1986) quoted a range of 16 to 19 Circum Vallate Papillae in their study. Text books of anatomy gave the number as 3-14.

The most common pattern of Circum Vallate Papillae in the present study happened to be inverted "V" pattern in both sexes followed by inverted "Y" pattern. Vastala Swamy et al (1986) described an inverted "V" pattern was most common pattern in their study; inverted Y pattern, irregular pattern, double row pattern were not described by them. Witt M and Reutter (1997) made an observation that Circum Vallate Papillae make their appearance between 8- 15 weeks of gestation in their study. Fetuses of gestational age of 21-25th weeks did not show clear trench around Circum Vallate Papillae in the present study.

The percentage of various types of pattern of arrangement is like this (TABLE NO 3) :

Inverted "V" pattern is the most common pattern - 68%
Inverted "Y" pattern is the next common pattern - 14%

Irregular pattern is the next common pattern - 8%
Double "V" pattern is the next common pattern - 6%
Duplication of stem of inverted "Y" pattern - 2%
Inverted "T" pattern is the least common pattern - 2%

Total - 100%

There is not much data available regarding this morphometric study of Circum Vallate Papillae in the human fetuses. That is the reason, this topic was chosen.

TABLE No. 1
Distribution of Circum Vallate Papillae in different age groups of 50 fetuses

| S. No | Age Group (in weeks) | Male (n=24) | Female (n=50) | Total no of fetuses (n=50) | Average no. of C.V.P. |
|-------|----------------------|-------------|---------------|----------------------------|-----------------------|
| 1 | 15-20 | - | 1 | 1 | 7 |
| 2 | 21-25 | 3 | 3 | 6 | 9 |
| 3 | 26-30 | 7 | 5 | 12 | 9 |
| 4 | 31-35 | 9 | 9 | 18 | 9 |
| 5 | 36-40 | 5 | 8 | 13 | 10 |

TABLE No. 2
Normal and Abnormal patterns of Circum Vallate Papillae

lae in different age groups


| Serial no. | Age of foetuses (in weeks) | Male (n=24) | | | Female (n=26) | | | Total (n=50) |
|------------|-----------------------------|-------------|--------|----------|---------------|--------|----------|--------------|
| | | Total | Normal | Abnormal | Total | Normal | Abnormal | |
| 1 | 15-20 | - | 1 | - | 1 | 1 | - | 1 |
| 2 | 21-25 | 3 | 2 | 1 | 3 | 1 | 2 | 6 |
| 3 | 26-30 | 7 | 6 | 1 | 9 | 3 | 2 | 12 |
| 4 | 31-35 | 9 | 6 | 3 | 8 | 7 | 2 | 18 |
| 5 | 36-40 | 5 | 3 | 2 | 4 | 4 | 4 | 13 |

TABLE No. 3
Various patterns of arrangement of Circum Vallate Papillae

| Serial no. | Types of arrangement | Male | Female | Total | Percentage (%) |
|------------|----------------------------|------|--------|-------|----------------|
| 1 | Inverted "V" | 18 | 16 | 34 | 68 |
| 2 | Inverted "Y" | 3 | 4 | 7 | 14 |
| 3 | Double row | 1 | 2 | 3 | 6 |
| 4 | Inverted "T" | - | 1 | 1 | 2 |
| 5 | Duplication of stem of "Y" | - | 1 | 1 | 2 |
| 6 | Irregular pattern | 2 | 2 | 4 | 8 |

TABLE No. 4
Number of fetuses and arrangement of papillae in 1st group(15-20wks)

PATTERNS OF ARRANGEMENT :




Normal inverted "Y"

| Gestational age (in weeks) | No. of fetuses | Type of arrangement of C.V.P. | |
|-------------------------------|-------------------|-------------------------------|----------|
| | | Normal | Abnormal |
| 15-20 | 1 | 1 | - |

TABLE No. 5
Number of fetuses and arrangement of papillae in 2nd group(21-25wks)

PATTERNS OF ARRANGEMENT :




Inverted "Y"


| Gestational age (in weeks) | No. of fetuses | Type of arrangement of C.V.P. | |
|-------------------------------|-------------------|-------------------------------|--|
| | | Normal | Abnormal |
| 21-25 | 6 | 3 | 3 (All are inverted "Y" pattern) |

TABLE No. 6
Number of fetuses and arrangement of papillae in 3rd group(26-30wks)

PATTERNS OF ARRANGEMENT :



Inverted "Y"




Irregular


| Gestational age (in weeks) | No. of fetuses | Type of arrangement of C.V.P. | |
|-------------------------------|-------------------|-------------------------------|---|
| | | Normal | Abnormal |
| 26-30 | 12 | 9 | 3 (2 inverted "Y" pattern, 1 irregular pattern) |

TABLE No. 7
Number of fetuses and arrangement of papillae in 4th group(31-35wks)


PATTERNS OF ARRANGEMENT :



Double Row



Irregular



Inverted "T"

| Gestational age (in weeks) | No. of fetuses | Type of arrangement of C.V.P. | |
|-------------------------------|-------------------|-------------------------------|--|
| | | Normal | Abnormal |
| 31-35 | 18 | 13 | 5 (2 double row pattern, 2 irregular pattern, 1 inverted "T" pattern) |


TABLE No. 8A
Number of fetuses and arrangement of papillae in 5th group(36-40wks)

PATTERNS OF ARRANGEMENT :


| Gestational age (in weeks) | No. of fetuses | Type of arrangement of C.V.P. | |
|-------------------------------|-------------------|-------------------------------|--|
| | | Normal | Abnormal |
| 36-40 | 13 | 7 | 6 (3 inverted "Y" pattern, 1 double row pattern, 1 irregular pattern, 1 duplication of stem of inverted "Y" pattern) |

TABLE No. 8B


36 - 40 Weeks




"Y" Pattern



Double Row Pattern



Irregular Pattern



Duplication of stem of "Y"

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