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Original Research Article

Correlation between occurrence of natural phenomena and incidence of two specific cyanotic congenital heart diseases: an exploratory study

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ABSTRACT

Background: Cyanotic congenital heart disease (CCHD), like transposition of the great arteries (TGA) and total anomalous pulmonary venous connection (TAPVC), arise from abnormal cardiac development during embryogenesis. While genetic and environmental factors are well-known, the influence of natural astronomical phenomena, such as the lunar cycle and eclipses, remains unexplored. This study evaluates a possible correlation between these events and the incidence of TGA and TAPVC.
Methods: Hospital records from 2020–2022 were reviewed to identify cases of TGA and TAPVC. The estimated conception period was calculated based on gestational age at birth. This period was then compared with the dates of natural astronomical events, like new moon, full moon, and eclipse (solar and lunar). The frequency of cases conceived during these events was analyzed for potential associations.
Results: Amongst 29 cases of TGA, 10 (34.4%) were conceived during an astronomical event, with 7 (24.1%) around the new moon period. Of the 49 TAPVC cases, 19 (38.7%) coincided with similar events, including 17 (34.7%) around the new moon period.
Conclusions: There is a positive correlation in the incidence of TGA and TAPVC in the offspring if conceived during the period of new moon. While preliminary, this warrants further prospective studies to explore astronomical influences on congenital heart disease.

Keywords: Cyanotic congenital heart disease, Lunar phases, Transposition of great arteries, Total anomalous pulmonary venous connection, Astronomical phenomena, Embryogenesis

INTRODUCTION

Cyanotic congenital heart diseases (CCHD), particularly transposition of the great arteries (TGA) and total anomalous pulmonary venous connection (TAPVC), are life-threatening conditions that occur due to abnormal development of the heart and its major blood vessels during embryogenesis. A lot of genetic and environmental factors have been implicated for these lesions. While they have been studied extensively, the potential influence of natural astronomical phenomena, like the new moon, solar, and lunar eclipses, on the prevalence of these diseases has sparked little scientific curiosity. This research aims to explore if there is any potential correlation between these phenomena and the occurrence of TGA and TAPVC.

Literature review

Minimal literature available on this subject suggests a connection between natural phenomena like the lunar

cycle and human health that has intrigued scientists and traditional practitioners for centuries. From ancient ayurvedic teachings to modern scientific research, the concept of cosmic influences on conception and pregnancy outcomes has remained a topic of exploration. This pilot study investigates the potential role of lunar phases, specifically the new moon (Amavasya), and its association with incidence of congenital heart lesions such TAPVC and TGA.

The ancient cultures have explored the role of cosmic events on pregnancy and health. A study conducted in Ocuituco, Mexico, in 1993, investigated the local belief that solar eclipses might harm pregnancies. The researchers found that these beliefs were deeply rooted in traditional health practices, reinforcing the idea that cosmic events could influence human physiology.[1] Similarly, the ancient civilizations as well as modern studies in the far east have explored the effect of lunar cycles on human health.

Traditional Chinese medicine explores a theory known as “lunaception”, which suggests that exposure to specific light cycles particularly moonlight can regulate menstrual cycles and improve fertility. An article published in 2020 proposes that replicating natural lunar light exposure could align menstrual and lunar cycles, thereby enhancing fertility and potentially influencing reproductive outcomes. This concept provides a theoretical basis for the influence of lunar phases, including the new moon, on biological processes, which may extend to conditions like congenital heart defects.[2] The scientific community has begun exploring the moon's potential physiological effects, particularly on cardiovascular and reproductive health.

A study by Tanaka et al examined circadian variations of plaque rupture in acute myocardial infarction, revealing that natural biological rhythms significantly impact cardiac events.[3]

Similarly, Wake et al explored the role of lunar gravitational forces in triggering myocardial infarctions, highlighting the moon's tangible influence on human cardiovascular systems.[4]

Recent research by Gokhale and Kumar in the article ‘Moon and Health: Myth or Reality?’ further examines the lunar impact on human health. Their study consolidates evidence linking lunar phases to physiological changes, emphasizing the need for further research into how these natural cycles may affect human well-being.[5] Röösli et al investigated how natural electromagnetic variations, including those influenced by lunar phases, might affect human biological rhythms. They proposed that these changes could alter melatonin hormone secretion, which plays a key role in regulating sleep and reproductive cycles—factors potentially relevant to early embryogenesis and fetal development.[6]

The Ashtanga Hridaya, authored by Vagbhata, is a foundational Ayurvedic text dating back to 7th century CE. It emphasizes the importance of timing in conception, highlighting the waxing moon as an optimal period for creating healthy offspring. According to its teachings, the new moon represents a time of subdued "Prana" (vital energy), rendering it unsuitable for conception. This notion is mirrored in the Manusmriti, an ancient Hindu philosophical text (circa 200 BCE–200 CE). The excerpt in chapter 3, verses on personal conduct states, "one should align personal milestones with favorable cosmic timings to ensure prosperity and health. Engaging in procreation during periods of low celestial influence, such as the new moon, is considered unfavorable.” It advises aligning life’s significant milestones with auspicious cosmic timings. While it doesn’t explicitly mention conception, traditional interpretations extend this guidance, warning against procreation during periods of diminished celestial vitality, like the new moon.[7]

Additionally, the Panchang, a traditional Hindu almanac, marks Amavasya as an inauspicious day for initiating new ventures, including conception. The verbatim translation of the text mentions, "Amavasya, the new moon day, is deemed unsuitable for conception as the lack of lunar light signifies a period of stagnation and diminished vitality. Couples are advised to plan conception during Purnima (full moon) when the lunar energy is at its peak." The auspiciousness section recommends planning conception during the full moon (Purnima), a time believed to be imbued with maximum lunar energy conducive to good health and well-being. These ancient perspectives underscore the belief in a cosmic influence on the vitality of life and its creation.[8]

Across cultures, folk traditions reinforce the avoidance of conception during Amavasya. The Sanskrit Smriti Texts and Folk Traditions Folk Literature Compilation, Regional Practices Section mentions, "Folk traditions maintain that Amavasya is a time when celestial energies are not conducive to new life. Couples are encouraged to seek auspicious timings to ensure the health and prosperity of their future children. These generational practices find parallels in the writings of Ayurvedic expert Dr. Vasant Lad. In his book, ‘The Ayurvedic Approach to Reproduction’, Chapter on Lunar Influences, Dr. Lad reiterates that, "Amavasya represents a time of introspection and reduced vitality. From an Ayurvedic perspective, attempting conception during this phase may not align with the optimal energetic conditions required for a healthy pregnancy."

Amavasya represents a period of low energy and introspection, making it an unfavorable time for conception. Such cultural and medical insights converge to form a consistent narrative about the influence of lunar phases on reproductive health.[9,10]

METHODS

This was a retrospective observational study conducted at the Department of Paediatric Cardiac Sciences, Bai Jerbai Wadia Hospital for Children, Mumbai, in collaboration with Seth GS Medical College and KEM Hospital, Mumbai. Hospital records between January 2020 and December 2022 were reviewed to identify patients diagnosed with TGA or TAPVC.

Inclusion criteria

Patients with echocardiographically confirmed diagnosis of TGA or TAPVC; cases with available maternal antenatal records and last menstrual period (LMP) details, and patients whose conception period could be estimated were included.

Exclusion criteria

Patients with incomplete antenatal or birth records; cases where the date of conception could not be reliably calculated, and patients with additional major congenital anomalies that might confound results were excluded.

Demographic data such as patient sex, maternal illnesses, maternal drug intake, folic acid supplementation, and perinatal history were collected. Clinical details including cyanosis, tachycardia, tachypnea, and surgical intervention were also noted. The mother's LMP was used to estimate the week of conception, which was cross-referenced with publicly available astronomical data (new moon, full moon, solar and lunar eclipses). Data were entered in Microsoft Excel (MS Excel) and analyzed for correlations between timing of conception and incidence of TGA or TAPVC.

RESULTS

Statistical analysis was conducted to determine the frequency of these cardiac conditions (TAPVC and TGA) in association with these natural phenomena.

A total of 78 patients were included in the study, comprising 29 cases of TGA and 49 cases of TAPVC. The demographic data can be presented as given in Table 1.

Our analysis revealed, of the 29 TGA cases, periods of respective conception coincided with some natural phenomena in 10 cases (34.4%). Periods of conception of 7 cases (24.1%) coincided with the dates of new moon; 2 cases (6.9%) coincided with the penumbral lunar eclipse and 1 case (3.4%) coincided with the annular solar eclipse (overlapping with the new moon) (Figure 1).

Of the 49 TAPVC cases, periods of respective conception coincided with some natural phenomena in 19 cases (38.7%). Periods of conception of 17 cases (34.7%) coincided with the dates of new moon; 2 cases (4.08%) coincided with the dates of the total solar eclipse (overlapping with the new moon) (Figure 2).

Table 1: Demographic data of TGA and TAPVC patients.

Parameter	TGA (n=29) (%)	TAPVC (n=49) (%)
Gender		
Male	18 (62.1)	28 (57.1)
Female	11 (37.9)	21 (42.9)
Pregnancy planned/unplanned		
Planned	18 (62.1)	34 (69.4)
Unplanned	11 (37.9)	15 (30.6)
Maternal illness		
None	26 (89.7)	41 (83.7)
Hypothyroidism	0	1 (2)
GDM	0	1 (2)
Cholestasis of pregnancy	1 (3.4)	0
Others/not specified	2 (6.9)	6 (12.3)
Maternal drug intake		
None	27 (93.1)	45 (91.8)
Thyronome	0	1 (2)
Insulin	0	1 (2)
Ayurvedic drugs	0	1 (2)
Drugs for cholestasis	1 (3.4)	0
Others/none	1 (3.4)	1 (2)
Folic acid supplementation		
Yes	19 (65.5)	35 (71.4)
No	8 (27.6)	12 (24.5)
Don't know	2 (6.9)	2 (4.1)
Folic acid started from (month)		
1st	1 (3.4)	0
1.5th	1 (3.4)	0
2nd	2 (6.9)	3 (6.1)
3rd	5 (17.2)	4 (8.2)
4th	3 (10.3)	6 (12.2)
5th	1 (3.4)	1 (2)
6th	1 (3.4)	1 (2)
Don't know	6 (20.7)	8 (16.3)
Not applicable	9 (31)	26 (53)
Term/preterm birth		
Term	25 (86.2)	49 (100)
Preterm	4 (13.8)	0
Cyanosis at presentation		
Yes	14 (48.3)	45 (91.8)
No	15 (51.7)	4 (8.2)
Surgery done		
Yes	19 (65.5)	48 (98)
No	10 (34.5)	1 (2)

Out of the 19 cases there were, 2 cases of mixed TAPVC, 2 cases of coronary sinus TAPVC and 15 cases of supracardiac TAPVC (supracardiac TAPVC is the most common variety of TAPVC and hence this finding of being

associated with natural phenomena may not be significant).

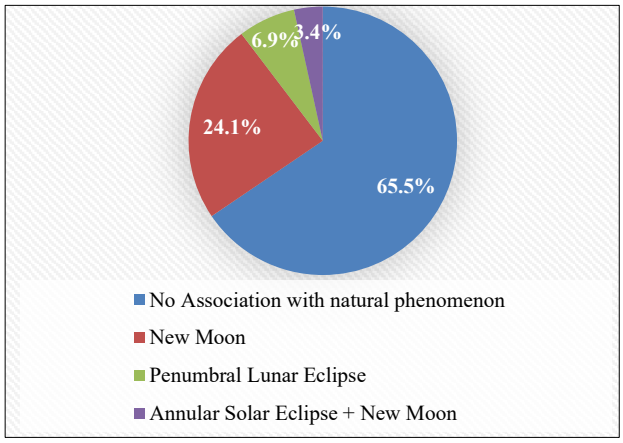

Figure 1: TGA cases and their correlation with various natural phenomena.

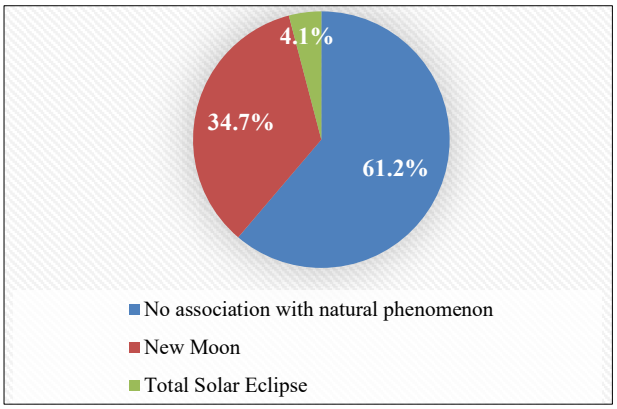

Figure 2: TAPVC cases and their correlation with various natural phenomena.

Out of the 29 TGA cases, and 49 TAPVC cases, the conception dates of only 3 cases of TGA, (out of which 1 coincided with penumbral lunar eclipse), and, only 1 case of TAPVC coincided with the full moon.

Thus, a negative association may be drawn between the occurrence of full moon and occurrence of TGA and TAPVC.

DISCUSSION

This study explored the association between natural astronomical phenomena and the incidence of cyanotic congenital heart diseases, specifically TGA and TAPVC. The results suggest that conceptions occurring around the new moon are more frequently associated with these lesions, while conceptions around the full moon appear to have a negative correlation.

The observation that 24.1% of TGA and 34.7% of TAPVC cases were conceived during a new moon is in agreement with traditional beliefs documented in ancient Indian texts such as the Panchang and Manusmriti, which regard Amavasya as an inauspicious period for conception.[6,7] Comparable findings were also noted in the study from Mexico, where cultural beliefs linked solar eclipses with adverse pregnancy outcomes.[1] Our findings appear to scientifically echo these long-held cultural perceptions.

Physiologically, the influence of lunar phases on reproductive biology may be mediated through circadian and hormonal mechanisms. Tanaka et al demonstrated that circadian variation influences cardiovascular events such as plaque rupture, while Wake et al suggested that lunar gravitational forces might act as triggers for myocardial infarction.[3,4] Extrapolating these concepts, similar gravitational or circadian influences at conception may disrupt embryonic development of the heart.

In contrast, only a minority of cases coincided with full moon phases. This apparent protective association is in line with Ayurvedic teachings that consider the full moon as a period of heightened vitality conducive to conception.[8,9] A recent review by Gokhale and Kumar also highlighted potential links between lunar phases and reproductive health outcomes.[5] Similarly, Röösli et al explored electromagnetic changes associated with lunar phases and their possible effect on biological rhythms.[6]

In the context of embryogenesis, the heart begins developing around the third week of gestation, during which time environmental and epigenetic influences may affect cardiac morphogenesis. Lunar phases, by affecting maternal circadian biology or melatonin secretion, could conceivably impact gene expression or early organ development.

Thus, when compared with prior literature, our results provide early quantitative support for cultural and theoretical claims linking lunar cycles with human reproduction and congenital anomalies. However, the small sample size and retrospective design limit the strength of the conclusions. Larger multicentric studies are needed to validate these findings.

Limitations

The limitations of this study are multifaceted and must be acknowledged. The small sample size restricts the statistical power and may limit the generalizability of the findings to a broader population. Hence, further studies involving larger sample sizes may provide a better proof of this hypothesis. Additionally, the focus on only two cyanotic congenital heart lesions, namely TAPVC and TGA restricts applicability to other congenital heart diseases, and including more lesions in future studies could address this limitation. This retrospective study relied on previously recorded hospital data, which could introduce biases such as incomplete or inconsistent documentation and variations in diagnostic criteria. Confounding factors like genetic predisposition, maternal health, or environmental influences that could contribute

to cyanotic congenital heart diseases could not be accounted for. Geographic and seasonal variations, as well as a lack of direct physiological data linking lunar phases to the conditions, further limit the findings. Despite these limitations, the study highlights the need for larger, prospective, and multicentric studies to explore the potential impact of lunar cycles on these diseases.

Ancient wisdom, cultural practices, and modern research collectively point to the potential influence of lunar cycles on conception and pregnancy outcomes. This pilot study builds on these insights, proposing that the new moon phase may contribute to the increased incidence of congenital heart defects. While these connections remain speculative, they open exciting avenues for interdisciplinary research, blending traditional knowledge with modern science to understand the moon's role in human health.

CONCLUSION

While direct quotations from primary ancient scriptures specifically advising against conception during Amavasya may be sparse, the collective insights from Ayurvedic texts, Dharmaśāstras like "Manusmriti", traditional Panchang guidelines, and scholarly interpretations of Mexican, Japanese, Chinese and Indian studies provide substantial support for this belief. These sources emphasize the importance of aligning reproductive activities with favourable lunar phases to promote foetal health and well-being, reflecting a deep-rooted cultural practice in Indian traditions.

This is entirely a descriptive study conducted with a small sample size. While this study finds a possible link between the occurrence of a natural phenomenon and the occurrence of cyanotic congenital heart disease (TGA and TAPVC), future studies on a larger patient population could explore the broader environmental and maternal factors influencing congenital heart diseases. Thus, this study paves a way for future studies in congenital cardiac diseases and the factors influencing their occurrence.

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