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Correlation Between Nasal Mucociliary Clearance and Peak Expiratory Flow Rate During Various Phases of Menstrual Cycle

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ABSTRACT

Nasal mucociliary clearance (NMC) time and peak expiratory flow rate (PEFR) were tested in 30 Indian healthy female volunteer medical students, 18-24 years of age, having regular menstrual cycles. NMC time was assessed by Andersen's saccharin technique. The mean values of NMC of two menstrual cycles were 10.81 ± 2.143, 8.233 ± 1.942 and 11.12 ± 2.118 in menstrual, proliferative and luteal phase, respectively. On comparing proliferative phase with menstrual and luteal phases, NMC time difference was highly significant ($p < 0.001$) and when luteal and menstrual phases were compared, results were not significant ($p > 0.05$). NMC time was significantly less in proliferative phase when compared with other two phases of menstrual cycles. Thus, various phases of menstrual cycle do have effect on nasal mucosa. This may be related to change in hormonal levels in different phases of menstrual cycle. PEFR and NMC time were measured during menstrual (2nd-4th day), proliferative (9th-12th day) and luteal phase (19th-21st day) of menstrual cycles. PEFR was measured by Wright's peak flow meter in standing position during various phases of two menstrual cycles. The mean of PEFR of two menstrual cycles was considered. On comparison of luteal and menstrual phases, the PEFR difference was found highly significant ($p < 0.001$). Similarly on comparing proliferative and luteal phases, the PEFR difference was found highly significant ($p < 0.001$). But on comparing menstrual and proliferative phases, the PEFR difference was not found significant ($p > 0.05$). When NMC and PEFR were correlated by Pearson's equation in all the three phases of menstrual cycle 1, then the correlation coefficient was found not significant in menstrual ($r = 0.330$, $p > 0.05$), proliferative ($r = 0.2499$, $p > 0.05$) and in luteal phase ($r = 0.3433$, $p > 0.05$), which showed that any increase or decrease in one parameter (NMC) is not significantly affecting other parameter (PEFR) in any phase of menstrual cycle. Similar results were found in menstrual cycle 2 and even when mean of both cycles was considered. The correlation coefficient of cycle 2 was $r = 0.3361$, $p > 0.05$ in menstrual, $r = 0.3375$, $p > 0.05$ in proliferative and $r = 0.3514$, $p > 0.05$ in luteal phase, which was not significant. The correlation coefficient of NMC and PEFR of both cycles was $r = 0.343$, $p > 0.05$ in menstrual, $r = 0.2903$, $p > 0.05$ in proliferative and $r = 0.3570$, $p > 0.05$ in luteal phase, which was also not significant.

Keywords: Menstrual cycle, menstrual phase, proliferative phase, luteal phase, NMC, PEFR

There is increased nasal obstruction in women at times of high blood estrogen levels, compared with controls, as measured by acoustic rhinometry and anterior rhinomanometry. Nasal congestion occurs along with the rise in serum estrogen levels seen at ovulation in the normal menstrual cycle. Haeggström et al found a connection between high blood estrogen levels and nasal mucosal reactivity. The study revealed that the nasal mucosa became hyperreactive to histamine in connection with ovulation, when the estrogen level in the blood reached its peak, thus suggesting some role of estrogen on nasal mucosa. Several factors and diseases like aging, smoking, lung diseases, rhinitis, irradiation, diabetes mellitus and various phases of menstrual cycle affect nasal mucociliary clearance (NMC).

Peak expiratory flow rate (PEFR) is a highly sensitive and accurate index of airway obstruction and is very useful in the diagnosis, management and follow-up of bronchial asthma and predicts the status of ventilatory lung function. PEFR can also be used as treatment scheme of asthma. PEFR is influenced by various phases of menstrual cycle. The variations in functional

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parameters of respiratory system may be related to fluctuations in the hormonal levels during various phases of menstrual cycle. PEFR is usually measured for the assessment of pulmonary functions. PEFR is maximal expiratory flow rate sustained by a subject for at least 10 msec expressed in liter per minute. PEFR has been used as measurement of ventilatory functions since long, as it is a much simpler and less exhaustive procedure compared to maximum voluntary ventilation (MVV).

MATERIAL AND METHODS

NMC time and PEFR were tested in 30 Indian healthy unmarried female volunteer medical students aged 18-24 years having regular menstrual cycles. NMC time on both sides was recorded during various phases of menstrual cycle, i.e., menstruation (2nd-4th day), follicular (9th-12th day) and luteal phase (19th-21st day), in 30 girls during two menstrual cycles. The mean of both menstrual cycles was taken as mean for calculations. Persons having anemia, common cold, nasal polyps, deviated nasal septum, chronic sinusitis, allergic rhinitis, atrophic rhinitis, chronic smokers and patients with recent nasal packings/surgery, cardiovascular and respiratory system diseases and on hormone therapy were excluded from study. Subjects were instructed to come to the laboratory on 2nd-4th day, 9th-12th day and 19th-21st day of menstrual cycles. NMC assessment was carried out during two menstrual cycles. If NMC assessment in any phase of a cycle was missed due to holiday or some other reason, then all the phases of next regular menstrual cycle were considered. NMC was assessed by Andersen's saccharin method in the present study. Saccharin test can be used for serial measurements during treatment, although it should be repeated only after the sweet taste has completely disappeared. A 1 mm particle of saccharin was placed on the floor of the nose approximately 1 cm behind the anterior end of inferior turbinate under direct vision with the subject in sitting position. They were asked to swallow at about every 30 seconds and to report the first change in their sensation of taste. The test was carried out in both the nostrils and the mean of the two was taken as mucociliary clearance time. This was done to obviate the effect, if any, of nasal cycle on the mucociliary clearance time. The time taken by the subjects from placement of particle to perception of sweet taste was recorded as the NMC time in minutes. All subjects were tested in similar environmental conditions and were instructed not to inhale or exhale forcefully, sniff, eat or drink and avoid coughing and sneezing during that time. Whenever there was coughing or sneezing, then the test was repeated.

The same subjects on which NMC was tested were instructed to come to the laboratory on 2nd-4th day, 9th-12th day and 19th-21st day of menstrual cycles to record PEFR. Recordings were carried out during two menstrual cycles. When recording during any phase of a cycle was missed due to holiday or some other reason, then all the phases of next menstrual cycle were considered. Wright's peak flow meter is widely used to measure the PEFR values. PEFR was recorded by Wright's peak flow meter by connecting subject with the help of mouthpiece. The recording scale was up to 1,000 L/min. The subject performed the test in standing position by holding peak flow meter properly. The subject was asked to take a deep breath and then to exhale it by forceful expiration as fast as possible after maintaining air tight seal between lips and mouthpiece of instrument. Maximum of three readings of PEFR was considered. PEFR was recorded in all phases of two menstrual cycles.

Data were analyzed by repetitive ANOVAs for comparison between all three phases of menstrual cycle and results were expressed in mean ± SD (standard deviation) and correlation between NMC and PEFR was done by Pearson's equation.

OBSERVATIONS AND RESULTS

Nasal Mucociliary Clearance

The mean values of NMC time in minutes in cycle 1 were 10.63 ± 2.23 , 8.258 ± 2.116 and 10.94 ± 2.208 in menstrual, proliferative and luteal phases, respectively while the mean values of NMC time in cycle 2 were 10.98 ± 2.107, 8.209 ± 1.795 and 11.3 ± 2.101 in menstrual, proliferative and luteal phases, respectively. When both cycles were considered, the mean values of NMC time were 10.81 ± 2.143, 8.233 ± 1.942 and 11.12 ± 2.118 in menstrual, proliferative and luteal phases, respectively (Table 1). It was found that there was significant decrease in NMC time in proliferative phase as compared to luteal and menstrual phases. On comparing menstrual with proliferative phase and proliferative with luteal phases, the NMC time difference was found highly significant ($p < 0.001$) in the two individual menstrual cycles as well as the mean of two cycles. But on comparing luteal with menstrual phases, the NMC time difference was found not significant ($p > 0.05$) in the two individual menstrual cycles as well as the mean of two cycles (Table 2).

Table 1. NMC Time Values (Minutes) among Various Phases of Menstrual Cycles

Cycles	Menstrual phase (2nd-4th day)	Proliferative phase (9th-12th day)	Luteal phase (19th-21st day)
Cycle 1	10.63 ± 2.23	8.258 ± 2.116	10.94 ± 2.208
Cycle 2	10.98 ± 2.107	8.209 ± 1.795	11.3 ± 2.101
Both cycles	10.81 ± 2.143	8.233 ± 1.942	11.12 ± 2.118

Mean ± SD

Table 2. Comparison of NMC Time among Various Phases of Menstrual Cycles

Cycles	Menstrual vs. proliferative	Proliferative vs. luteal	Luteal vs. menstrual
Cycle 1	P < 0.001	P < 0.001	P > 0.05
Cycle 2	P < 0.001	P < 0.001	P > 0.05
Both cycles	P < 0.001	P < 0.001	P > 0.05

P < 0.001= Highly significant, p > 0.05 = Not significant.

Table 3. PEFR (Liters/Min) in Various Phases of Menstrual Cycles

Cycles	Menstrual phase (2nd-4th day)	Proliferative phase (9th-12th day)	Luteal phase (19th-21st day)
Cycle 1	335.0 ± 32.88	342.2 ± 32.53	381.2 ± 26.51
Cycle 2	336.7 ± 29.63	338.7 ± 28.74	387.0 ± 26.80
Both cycles	335.8 ± 30.85	340.4 ± 29.73	384.1 ± 26.41

Mean ± SD

Table 4. Comparison of PEFR among Various Phases of Menstrual Cycles

Cycles	Menstrual vs. proliferative	Proliferative vs. luteal	Luteal vs. menstrual
Cycle 1	P > 0.05	P < 0.001	P < 0.001
Cycle 2	P > 0.05	P < 0.001	P < 0.001
Both cycles	P > 0.05	P < 0.001	P < 0.001

P < 0.001= Highly significant, p > 0.05 = Not significant.

Peak Expiratory Flow Rate

The mean values of PEFR in cycle 1 were 335.0 ± 32.88, 342.2 ± 32.53 and 381.2 ± 26.51 in menstrual, proliferative and luteal phases, respectively while mean values of PEFR in cycle 2 were 336.7 ± 29.63, 338.7 ± 28.74 and 387.0 ± 26.80 in menstrual, proliferative and luteal phases, respectively. When both cycles were considered the mean PEFR values were 335.8 ± 30.85, 340.4 ± 29.73 and 384.1 ± 26.41 in menstrual, proliferative and luteal phases, respectively (Table 3). PEFR was found significantly increased in luteal phase as compared to menstrual and proliferative phase in the two individual menstrual cycles as well as the mean of two cycles. On comparison of luteal and menstrual phases, the PEFR difference was found highly significant ($p < 0.001$) in the two individual menstrual cycles as well as the mean of two cycles. Similarly on comparing proliferative and luteal phases, the PEFR difference was found highly significant ($p < 0.001$) in the two individual menstrual cycles as well as the mean of two cycles. But on comparing menstrual and proliferative phases, the PEFR difference was not found significant ($p > 0.05$) in the two individual menstrual cycles as well as the mean of two cycles (Table 4).

Correlation of NMC and PEFR in Various Phases of Menstrual Cycles

When NMC and PEFR were correlated in all the three phases of menstrual cycle 1, the correlation coefficient was not significant in menstrual ($r = 0.330$, $p > 0.05$),

Table 5. Correlation of NMC and PEFR in Various Phases of Menstrual Cycles

Cycle	Menstrual phase	Proliferative phase	Luteal phase
Cycle 1	r = 0.3307	r = 0.2499	r = 0.3433
	r^2 = 0.1094	r^2 = 0.06243	r^2 = 0.1178
	P = 0.0743	P = 0.183	P = 0.0633
Cycle 2	r = 0.3361	r = 0.3375	r = 0.3514
	r^2 = 0.113	r^2 = 0.1139	r^2 = 0.1235
	P = 0.0694	P = 0.0682	P = 0.0569
Both cycles	r = 0.3437	r = 0.2903	r = 0.3570
	r^2 = 0.1181	r^2 = 0.08425	r^2 = 0.1274
	P = 0.0630	P = 0.1197	P = 0.0528

R = Pearson's r, p > 0.05 = Not significant.

proliferative (r = 0.2499, p > 0.05) and in luteal phase (r = 0.3433, p > 0.05), which showed that any increase or decrease in one parameter (NMC) is not significantly affecting the other parameter (PEFR) in any phase of menstrual cycle. Similar results were found in cycle 2 and even when mean of both cycles were considered. The correlation coefficient of cycle 2 was r = 0.3361, p > 0.05 in menstrual, r = 0.3375, p > 0.05 in proliferative and r = 0.3514, p > 0.05 in luteal phase, which was not significant. The correlation coefficient of NMC and PEFR of both cycles was r = 0.343, p > 0.05 in menstrual, r = 0.2903, p > 0.05 in proliferative and r = 0.3570, p > 0.05 in luteal phase which was also not significant (Table 5).

DISCUSSION

Menstrual cycle is an integral part of female reproductive system which reflects a complex interplay between brain, pituitary gland and ovary. Menstrual cycle occurs in three phases, i.e., menstrual, follicular and luteal. The mean menstrual cycle is of 28 days. Levels of hormones in the three phases of menstrual cycle are fluctuating. This fluctuation in sex hormones plays a major role in virtually all physiological processes and hence affects various systems of human body. In our study, we studied the effect of different phases of menstrual cycle on NMC and PEFR and their correlation. There is a connection between symptoms such as nasal stuffiness and coryza and hormonal variations in pregnancy, use of contraceptives and menstrual cycle phases. Andersen et al described saccharin test, which is a simple and reproducible clinical test for determining abnormal NMC. Deborah et al also emphasized that saccharin test is a simple, inexpensive and noninvasive method, while methods using radiolabeled particles are time consuming, inconvenient and expensive.

The mechanism of action of sex steroid hormones is via their own unique receptors: estrogen receptor (ER-α and ER-β), progesterone receptor (PR-A and PR-B) and an androgen receptor. Estradiol binds with a higher affinity to ER than its metabolic products such as estrone and estriol. It is known that estrogen and progesterone receptors have a role in sexual development. However, their effect beyond the reproductive system is becoming increasingly recognized. The ER-α, ER-β, PR-A and PR-B receptors are expressed in rats, mice and humans. Androgen receptors are expressed primarily in mammalian reproductive tissues. ER-α, ER-β, PR-A and PR-B expression have been found not only in the mammalian female and male reproductive tracts, but also in the female mammary glands, bone, cardiovascular tissues, lung, brain and nasal mucosa.

Among the factors influencing NMC, the most important is acetylcholine (Ach), a vasodilator neurohumoral transmitter secreted at somatic and autonomic sites under normal and physiological conditions. Most of the Ach is present in the ionic solution within the synaptic vessels but some is also found in free form in the cytoplasm of cholinergic nerve endings. It is destroyed by enzyme acetylcholinesterase. Muscarinic receptors are believed to play an important role in modulation of ciliary action in respiratory system's activity. The cryostimulation by methacholine in human upper airway mucosa involves M1- and M3-muscarinic receptor subtypes, but not the M2-receptor subtype. Aerosolized methacholine stimulated the ciliary beat frequency (CBF) from the baseline of 5.8 ± 0.7 to 9.4 ± 3.0 Hz. The hypothalamic

stimulus that leads to release of female hormones also releases Ach in nasal mucosa. The hormones are selectively concentrated in nasal mucosa almost 1,000-fold and inhibit acetylcholinesterase, hence increasing local concentration of acetylcholine that leads to increase in vasomotor reaction and thus mucociliary clearance. Acetylcholine itself increases CBF while atropine causes the reduction in the secretion of the nose and hence depresses the CBF. A study was done on dogs to find stimulation of CBF by autonomic agonists *in vivo*. It was assumed that increase in autonomic activity would result in increase in CBF *in vivo*. It was found that CBF in the lower respiratory tract is regulated by autonomic agonists. This was perhaps due to effect of estrogen on autonomic system.

Toppozada et al, through their studies on humans, demonstrated that the morphological and histochemical changes occurring in the nasal mucosa were associated with estrogen in healthy fertile women during the menstrual cycle. Navarrete-Palacios et al did cytological analysis in different phases of the menstrual cycle which revealed that both nasal and vaginal smear showed the same characteristics, suggesting that cell turnover in the nasal epithelium is influenced by hormonal state during the menstrual cycle. Serra et al studied 88 women with ovulatory menstrual cycle, who underwent nasal sampling with a cytobrush of the middle and inferior nasal turbinates under direct vision during the follicular, periovular and luteal phases of the menstrual cycle. Hematoxylin-eosin staining revealed the cytological characteristics of the nasal respiratory epithelium and of vaginal smears correlated according to the three different phases of the menstrual cycle, suggesting that the vaginal cells as well as the nasal respiratory epithelium is an ovarian steroid target. Millas et al evaluated the presence of specific estrogen receptors (α and β) in the inferior turbinate of asymptomatic patients, in order to characterize the influence of hormones on physiology and pathological nasal processes and showed the presence of α and β receptors, with higher β expression and higher intensity in the anterior portion of the inferior turbinate.

Shirasaki et al studied nasal mucosa by using immunohistochemistry and observed antibodies to glucocorticoid receptor (GR) that showed the presence of GR within all cells of nasal mucosa, with the highest quantities of GR being localized in epithelial cells, submucosal glands and inflammatory leukocytes. Immunohistochemical analysis of sex steroid receptor demonstrated anti-ERα antibody labeled mast cells and anti-ERβ antibody labeled submucosal glands, showing the presence of ERα and ERβ but no progesterone receptor or androgen receptors.

Armnostone et al studied nasal mucociliary transport time using the vegetable charcoal powder technique. Three measurements were made at different points of the cycle, i.e., during the early follicular phase, periovulatory phase and luteal phase. Transit was found to be significantly accelerated during the periovulatory phase ($p < 0.01$), when the serum estrogens are at their highest. In our study, we found almost same results by using saccharin method. Transit was significantly accelerated during the proliferative phase ($p < 0.01$).

Littlejohn et al studied NMC in both the congested and decongested phases of the cycle. The results were statistically significant and suggested a difference in NMC between the two phases of cycle, with the congested phase having more rapid clearance.

Stübner et al reported that for influencing the neurogenic nasal symptoms, higher hormone concentrations seem to be necessary than those achieved after administration of oral contraceptives.

Haeggström et al found a connection between high blood estrogen levels and nasal mucosal reactivity. They found that the nasal mucosa became hyperreactive to histamine during ovulation, when the blood level of estrogen reached its peak suggesting some role of estrogen on nasal mucosa. Philpott et al also found some association between nasal symptoms and blood estrogen levels. It was observed that there was increased nasal obstruction in women at times of high blood estrogen levels when compared with a control group by using acoustic rhinometry, anterior rhinomanometry and measurements of peak inspiratory nasal flow. It was due to nasal congestion at the periovulatory stage of the cycle, of which anterior rhinomanometry and mucociliary time were decreased significantly ($p < 0.05$). Nasal congestion thus occurs in association with the rise in serum estrogens occurring at ovulation in the normal menstrual cycle. So, it was suggested that pharmacological antagonism of estrogens may alleviate nasal congestion and should be further explored.

Nappi et al found that both intranasal and transdermal hormonal therapy (HT) with 17-β estradiol improved nasal symptomatology and nasal mucosa appearance and reduced mean mucociliary transport time.

Soylu et al studied, in premenopausal and postmenopausal women, the mean NMC time and found that in postmenopausal women, the mean NMC time was significantly longer than in premenopausal women ($p < 0.0001$). There was a positive correlation

between menopause duration and NMC time in postmenopausal women ($p < 0.0001$).

These studies are at par with our study which showed that there was significant decrease in NMC time in proliferative phase as compared to luteal and menstrual phases. On comparing menstrual and proliferative phases, the NMC time difference was found highly significant ($p < 0.001$). Similarly on comparing luteal and proliferative phases, the NMC time difference was found highly significant ($p < 0.001$). But on comparing menstrual and luteal phases, the NMC time difference was not found significant ($p > 0.05$).

Changes in lung function have been reported in different phases of menstrual cycle owing to action of hormone progesterone. Some studies showed that phases of menstrual cycle and individual cycles had no significant effect on spirometry variables except for peak expiratory flow and respiratory static pressures. The correlations observed between sex hormones and respiratory control variables hint at a positive influence of female sex hormones controlling the thoracic pump muscles in luteal phase. According to a study, the pulmonary functions qualified as lung volumes and capacities were better during luteal phase of the menstrual cycle, pointing to a possible beneficial role of progesterone in management of premenstrual asthma.

PEFR and forced expiratory volume in 1 second (FEV_1) have been reported to be increased in luteal phase ($p < 0.05$) and this increase in PEFR and FEV_1 is suggestive of decreased airway resistance. Lower PEFR and slow vital capacity (SVC) in postmenopausal women in comparison to premenopausal women during follicular and luteal phase are most likely due to decreased level of progesterone and estrogen. Reduced levels of estrogen and progesterone would increase compression of thoracic spine, decrease the relaxation of bronchial smooth muscle and decrease muscular strength, thus resulting in decreased level of forced expiratory flow (FEF_{25-75}), PEFR and SVC.

Another study showed significantly higher serum progesterone and forced vital capacity (FVC), FEV_1 and PEFR during secretory phase and a strong positive correlation of serum progesterone in secretory phase with FVC and negative correlation with FEV_1%. The improvement of pulmonary function during secretory phase was related with increase in serum progesterone levels which have a dual effect of overall smooth muscle relaxation and hyperventilation. But some other studies showed that although there was increase in FEV_1 and FVC in secretory phase which may be due to domination of estrogen in follicular phase which in turn increases the resting minute volume in secretory phase, but, there was no significant difference when PEFR was compared in different phases of menstrual cycle.

A study was conducted to ascertain the effect of normal physiological fluctuation of serum progesterone on PEFR. PEFR% was higher in luteal phase as compared to follicular phase of premenopausal women, and the relationship was significant ($p < 0.01$, $r = 0.995$). Thus, it was suggested that the normal cyclical progesterone hormone level should be considered while interpreting PEFR%.

Similarly, in our study also, PEFR was significantly higher in luteal phase than proliferative phase. Both exogenous progesterone and estradiol administration have been reported to improve asthma in women. In a few patients, intramuscular supplementary progesterone eliminated the premenstrual fall in PEFR and allowed better control of asthma as lower concentration of progesterone in premenopausal phase may be a possible mechanism for premenstrual asthma.

In our study, PEFR was found significantly increased in luteal phase as compared to menstrual and proliferative phase in the two individual menstrual cycles as well as the mean of two cycles ($p < 0.001$).

In our study, no correlation was observed between NMC and PEFR in three phases of menstrual cycle. Review of English literature on NMC and PEFR did not reveal any reported study on correlation of NMC and PEFR. It needs to be elucidated by further studies.

CONCLUSION

NMC time was found significantly decreased in proliferative phase while PEFR was significantly increased in luteal phase of normal menstrual cycle in young healthy females. There was no correlation between NMC and PEFR during various phases of normal menstrual cycles.

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WHO Issues Its First Emergency Use Validation for a Vaccine Against COVID-19

The WHO has listed the Pfizer-BioNTech COVID-19 mRNA vaccine for emergency use, thus making it the first one to be given emergency validation by the agency.

This Emergency Use Listing (EUL) will enable countries to speed up their own regulatory approval processes for import and administration of the vaccine. It will also allow UNICEF and the Pan-American Health Organization to procure the vaccine for distribution to countries in need. Dr Mariângela Simão, WHO Assistant-Director General for Access to Medicines and Health Products, called it a positive move towards ensuring global access to COVID-19 vaccines and emphasized on the need for greater effort to attain enough vaccine supply to meet the demands of priority populations across the globe… (*WHO*)

Microvascular Injury of Brain, Olfactory Bulbs Noted in COVID-19

Multifocal microvascular injury in the brain and olfactory bulbs appears to be a possible adverse outcome from COVID-19, suggests new research published online December 30 as a "correspondence" in the *New England Journal of Medicine*.

Postmortem magnetic resonance imaging (MRI) brain scans of 13 patients who died from COVID-19 exhibited abnormalities in 10 participants. Nine of these had punctate hyperintensities, representing areas of microvascular injury and fibrinogen leakage, suggested the investigators. Immunostaining demonstrated thinning of the basal lamina in 5 of these patients. Additional evaluation revealed punctate hypointensities linked to congested blood vessels in 10 patients. These areas were interpreted as microhemorrhages. There was no evidence of viral infection, including SARS-CoV-2… (*Medscape*)

Gabapentinoids *plus* Opioids Increase Overdose Risk After Surgery

Gabapentinoids, gabapentin or pregabalin, added to opioids the day of surgery appeared to heighten the risk of opioid overdose and other adverse events, though absolute risks appeared to be low, reported an observational study.

In the study of nearly 5.5 million surgical admissions, including around 9,00,000 patients who received gabapentinoids with opioids, 441 overdose events were recorded. Absolute risk of overdose was 1.4 per 10,000 patients with gabapentinoid exposure and 0.7 per 10,000 patients with opioids only, reported researchers in *JAMA Network Open*. After propensity score trimming, adjusted HR for opioid overdose was 1.95 (95% CI 1.49-2.55) and the number needed to treat for an additional overdose to occur was 16,914 patients (95% CI 11,556-31,537)… (*Medpage Today*)

Every citizen of India should have the right to accessible, affordable, quality and safe heart care irrespective of his/her economical background

HEART CARE FOUNDATION OF INDIA
A Not-For-Profit Organisation

Sameer Malik Heart Care Foundation Fund

An Initiative of Heart Care Foundation of India

E-219, Greater Kailash, Part I, New Delhi - 110048 E-mail: heartcarefoundationfund@gmail.com Helpline Number: +91 - 9958771177

"No one should die of heart disease just because he/she cannot afford it"

About Sameer Malik Heart Care Foundation Fund

"Sameer Malik Heart Care Foundation Fund" it is an initiative of the Heart Care Foundation of India created with an objective to cater to the heart care needs of people.

Objectives

- Assist heart patients belonging to economically weaker sections of the society in getting affordable and quality treatment.
- Raise awareness about the fundamental right of individuals to medical treatment irrespective of their religion or economical background.
- Sensitize the central and state government about the need for a National Cardiovascular Disease Control Program.
- Encourage and involve key stakeholders such as other NGOs, private institutions and individual to help reduce the number of deaths due to heart disease in the country.
- To promote heart care research in India.
- To promote and train hands-only CPR.

Activities of the Fund

Financial Assistance

Financial assistance is given to eligible non emergent heart patients. Apart from its own resources, the fund raises money through donations, aid from individuals, organizations, professional bodies, associations and other philanthropic organizations, etc.

After the sanction of grant, the fund members facilitate the patient in getting his/her heart intervention done at state of art heart hospitals in Delhi NCR like Medanta – The Medicity, National Heart Institute, All India Institute of Medical Sciences (AIIMS), RML Hospital, GB Pant Hospital, Jaipur Golden Hospital, etc. The money is transferred directly to the concerned hospital where surgery is to be done.

Drug Subsidy

The HCFI Fund has tied up with Helpline Pharmacy in Delhi to facilitate patients with medicines at highly discounted rates (up to 50%) post surgery.

The HCFI Fund has also tied up for providing up to 50% discount on imaging (CT, MR, CT angiography, etc.)

Who is Eligible?

All heart patients who need pacemakers, valve replacement, bypass surgery, surgery for congenital heart diseases, etc. are eligible to apply for assistance from the Fund. The Application form can be downloaded from the website of the Fund. http://heartcarefoundationfund.heartcarefoundation.org and submitted in the HCFI Fund office.

Important Notes

- The patient must be a citizen of India with valid Voter ID Card/ Aadhaar Card/Driving License.
- The patient must be needy and underprivileged, to be assessed by Fund Committee.
- The HCFI Fund reserves the right to accept/reject any application for financial assistance without assigning any reasons thereof.
- The review of applications may take 4-6 weeks.
- All applications are judged on merit by a Medical Advisory Board who meet every Tuesday and decide on the acceptance/rejection of applications.
- The HCFI Fund is not responsible for failure of treatment/death of patient during or after the treatment has been rendered to the patient at designated hospitals.
- The HCFI Fund reserves the right to advise/direct the beneficiary to the designated hospital for the treatment.
- The financial assistance granted will be given directly to the treating hospital/medical center.
- The HCFI Fund has the right to print/publish/webcast/web post details of the patient including photos, and other details. (Under taking needs to be given to the HCFI Fund to publish the medical details so that more people can be benefitted).
- The HCFI Fund does not provide assistance for any emergent heart interventions.

Check List of Documents to be Submitted with Application Form

- Passport size photo of the patient and the family
- A copy of medical records
- Identity proof with proof of residence
- Income proof (preferably given by SDM)
- BPL Card (If Card holder)
- Details of financial assistance taken/applied from other sources (Prime Minister's Relief Fund, National Illness Assistance Fund Ministry of Health Govt of India, Rotary Relief Fund, Delhi Arogya Kosh, Delhi Arogya Nidhi), etc., if anyone.

Free Diagnostic Facility

The Fund has installed the latest State-of-the-Art 3 D Color Doppler EPIQ 7C Philips at E – 219, Greater Kailash, Part 1, New Delhi.
This machine is used to screen children and adult patients for any heart disease.

Free Education and Employment Facility

HCFI has tied up with a leading educational institution and an export house in Delhi NCR to adopt and to provide free education and employment opportunities to needy heart patients post surgery. Girls and women will be preferred.

Laboratory Subsidy

HCFI has also tied up with leading laboratories in Delhi to give up to 50% discounts on all pathological lab tests.

Help Us to Save Lives

The Foundation seeks support, donations and contributions from individuals, organizations and establishments both private and governmental in its endeavor to reduce the number of deaths due to heart disease in the country. All donations made towards the Heart Care Foundation Fund are exempted from tax under Section 80 G of the IT Act (1961) within India. The Fund is also eligible for overseas donations under FCRA Registration (Reg. No 231650979). The objectives and activities of the trust are charitable within the meaning of 2 (15) of the IT Act 1961.

Donate Now...

About Heart Care Foundation of India

Heart Care Foundation of India was founded in 1986 as a National Charitable Trust with the basic objective of creating awareness about all aspects of health for people from all walks of life incorporating all pathies using low-cost infotainment modules under one roof.

HCFI is the only NGO in the country on whose community-based health awareness events, the Government of India has released two commemorative national stamps (Rs 1 in 1991 on Run For The Heart and Rs 6.50 in 1993 on Heart Care Festival- First Perfect Health Mela). In February 2012, Government of Rajasthan also released one Cancellation stamp for organizing the first mega health camp at Ajmer.

Objectives

- Preventive Health Care Education
- Perfect Health Mela
- Providing Financial Support for Heart Care Interventions
- Reversal of Sudden Cardiac Death Through CPR-10 Training Workshops
- Research in Heart Care

Heart Care Foundation Blood Donation Camps

The Heart Care Foundation organizes regular blood donation camps. The blood collected is used for patients undergoing heart surgeries in various institutions across Delhi.

Committee Members

Chief Patron

Raghu Kataria

Entrepreneur

President

Dr KK Aggarwal

Padma Shri, Dr BC Roy National & DST National Science Communication Awardee

Governing Council Members

Sumi Malik
Vivek Kumar
Karna Chopra
Dr Veena Aggarwal
Veena Jaju
Naina Aggarwal
Nilesh Aggarwal
H M Bangur

Advisors

Mukul Rohtagi
Ashok Chakradhar

Executive Council Members

Deep Malik
Geeta Anand
Dr Uday Kakroo
Harish Malik
Aarti Upadhyay
Raj Kumar Daga
Shalin Kataria
Anisha Kataria
Vishnu Sureka
Rishab Soni

This Fund is dedicated to the memory of **Sameer Malik** who was an unfortunate victim of sudden cardiac death at a young age.

- HCFI has associated with Shree Cement Ltd. for newspaper and outdoor publicity campaign
- HCFI also provides Free ambulance services for adopted heart patients
- HCFI has also tied up with Manav Ashray to provide free/highly subsidized accommodation to heart patients & their families visiting Delhi for treatment.

http://heartcarefoundationfund.heartcarefoundation.org