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RESEARCH ARTICLE

A PROSPECTIVE CLINICAL STUDY HEATED HUMIDIFIED HIGH FLOW NASAL CANNULA VERSUS NASAL CONTINUOUS POSITIVE AIRWAY PRESSURE AS PRIMARY MODE OF RESPIRATORY SUPPORT FOR RESPIRATORY DISTRESS IN PRETERM INFANTS

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Abstract

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Introduction:-

Respiratorydistresssyndromeisa major etiology of respiratorymorbidity in preterm neonateswith incidenceof37.28%[1].

Non-invasive ventilator strategysuchasnasalcontinuouspositiveairwaypressure(NCPAP)andearlysurfactantisknowntoreduce the lung inflammationand injury associated mechanicalventilation(MV)[2].

Heated humidified high flow nasal cannula (HHHFNC) is a newerdeviceforNIVthatassistsbreathingbydeliveringpositivedistendingpressurewithoutclinicallimitationofNCPAP[3.

HHHFNC has gained popularity in developed countries given itsperceivedbenefitsofeaseofadministrationuserandbabyfriendlyandinterfaceand less nasaltrauma[4].

Hence the present study was undertaken to study the efficacy ofHHHFNCincomparisonwithNCPAPasaprimarymodeofrespiratorysupport in respiratorydistress.

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Objective:-

To study the effectiveness of HHHFNC compared to NCPAP inreducingtheneedformechanicalventilationwithin72hrsoflifewhen used as a primary mode of respiratory support in preterminfantswithmoderateRespiratorydistress.

Material&Methods:-

StudyDesign:

Prospectivehospitalbasedobservationalstudy.

Studyarea:

Thepresentstudywasconductedinthedepartmentofpaediatrics, M V J Medical College and Research Hospital, Hoskote,Bangalore,Karnataka.

StudyPeriod:
2months.

Studypopulation:
Neonatesfulfillingtheinclusioncriteriaadmittedduringthestudyperiod.

Samplesize:
studyconsistedatotalof22cases.

Samplingmethod:
SimpleRandomsamplingmethod.

Inclusioncriteria:
Preterminfantsbetween28-34weeksofgestationandmorethan1000gms with mild to moderate RD (SAS score 4-6) within 6hrs ofbirth.

Exclusioncriteria:
Infantswith5minsAPGARscore<5.

Nasalpharyngealpathologycleftliporpalate,choanalatresia.

Majorcongenitalmalformations.

Thoseantenataldetectedcongenitalheartdiseases.

StudytoolsandDatacollectionprocedure:
Neonatesfulfillingtheinclusioncriteriawereadmittedduringthestudyperiod.

EligibleneonateswillberandomizedtoeitherHHHFNC/NCPAPgroupusingcomputergeneratedtableofrandomnumber.

MildtomoderateRDisdefinedasSASscore(3-6);Fio2requirement<60%atinitiationtomaintainSP0292-95%andarterialPH>7.2;PCO2<60.

HHHFNCwillbeadministeredusingRT329infantoxygentherapybreathingcircuitandMR850humidifier(FisherandPaykelhealthcare)usingshortbinasalprongs.

NCPAPwillbedeliveredbybubbleCPAPsystem(FisherandPaykelhealthcare)withMR850humidifierusingshortbinasalprongsasinterface.

InfantsdiagnosedtohavefailedHHHFNCorNCPAPwillbeputonMVwhenthey remainedhypoxicb)SASscore>6c)hadrecurrentapnea(>3episodeswithin24hrs)d)PH<7.2Paco2>60mmhge) requiredinotropicsupport.

Results:-

Inourstudy,50%ofthestudysubjectsweremalesandanother50%werefemales.

Thedistributionofsexaccordingtomodeofrespiratorysupportalso50%ineachgroup.

Male to females' ratio was 1:1 in our study. In our study, out of 32, in28.1%(9)ofthestudysubjects,primaryrespiratorysupportwasconvertedinto mechanicalventilation.

Among the conversion37.5%(6)were in theCPAPgroup,whereas18.7% (3)were in HHHFNCgroup.

The association was not statisticallySignificant but larger proportion ofCPAPgroupneededmechanicalventilationin ourstudy.

Statistical analysis:
Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square test was used as test of significance for qualitative data. Normality of the continuous data, was tested by Kolmogorov–Smirnov test and the Shapiro–Wilk test. Independent t test was used as test of significance to identify the mean difference between two quantitative variables.

Graphical representation of data: MS Excel and MS word were used to obtain various types of graphs such as bar diagram.

p value(Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical software:
MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

Results:-

Table 1:- Sex distribution comparison between two groups.

		Group			
		HHFNC		CPAP	
		Count	Column N %	Count	Column N %
Sex	Female	8	50.0%	8	50.0%
	Male	8	50.0%	8	50.0%

Chi-square = 0.000, df = 1, p value = 1.000

In both groups, 50% were males and females respectively. There was no difference in sex difference between two groups.

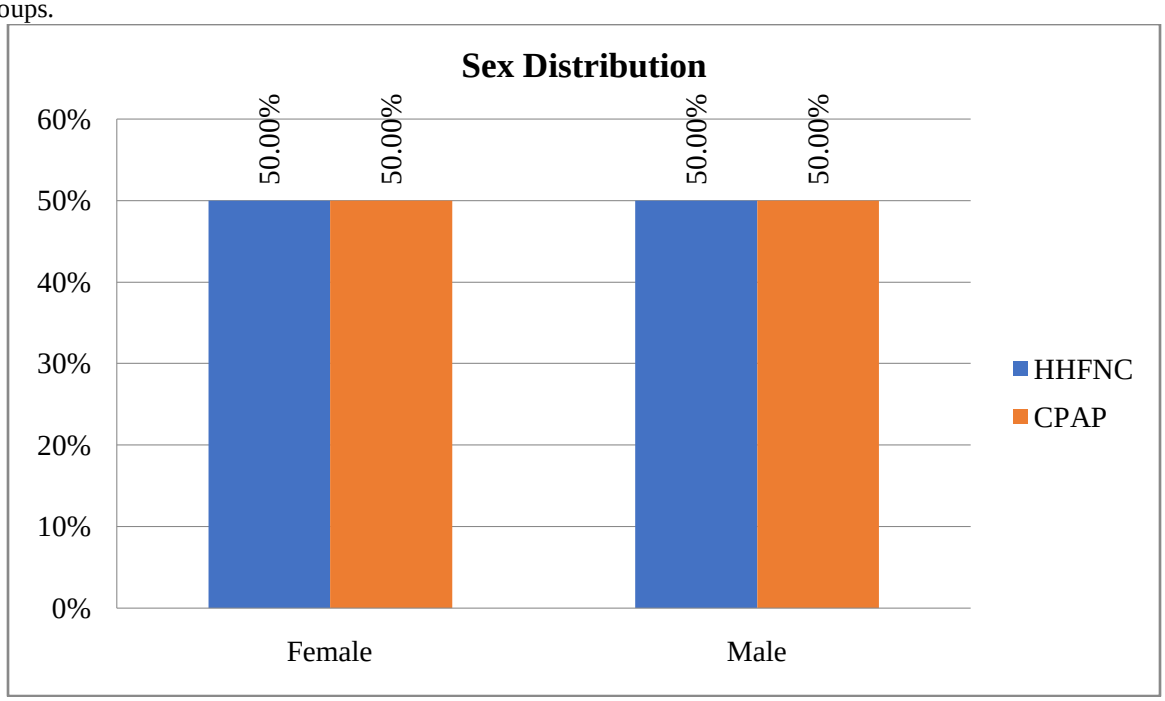

Figure 1:- Bar diagram showing Sex distribution comparison between two groups.

Table 2:- Period of Gestation comparison between two groups.

	Group	N	Mean	SD	P value
Period of Gestation	HHFNC	16	30.94	1.982	0.848
	CPAP	16	31.06	1.652	

Mean period of gestation in HHFNC group was 30.94 ± 1.982 weeks and in CPAP group was 31.06 ± 1.652 weeks. There was no significant difference in mean Period of gestation between two groups.

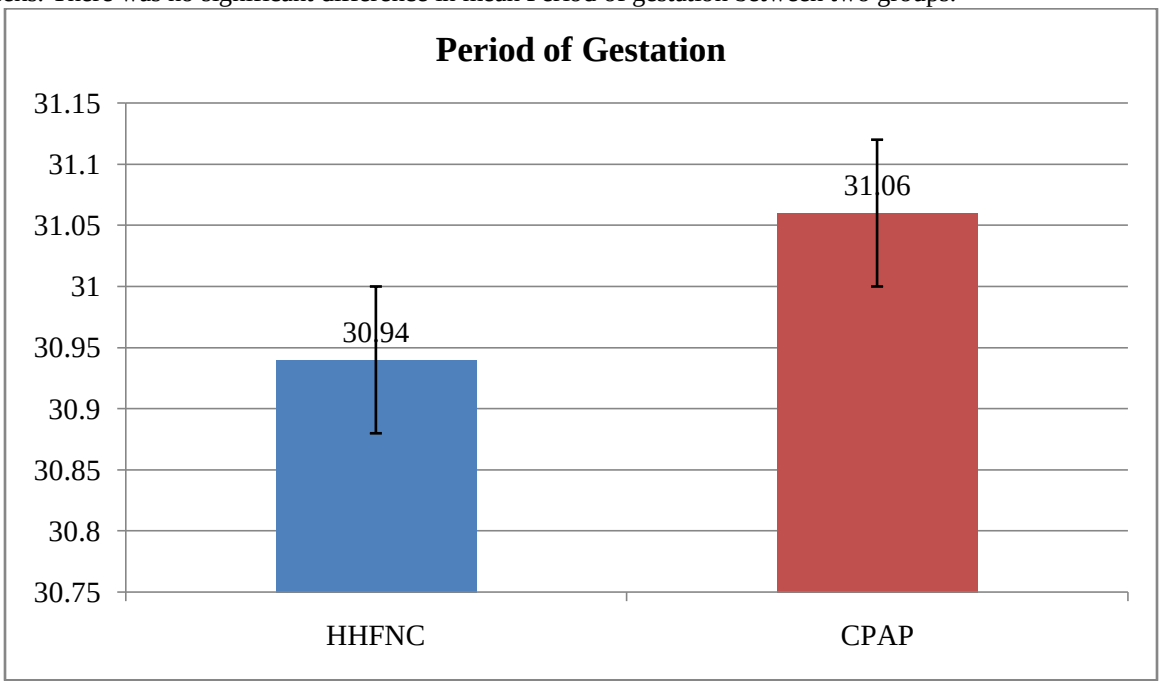

Figure 2:- Bar diagram showing Period of Gestation comparison between two groups.

Table 3:- Weight comparison between two groups.

	Group	N	Mean	SD	P value
Weight	HHFNC	16	1.89	0.28	0.863
	CPAP	16	1.90	0.28	

Mean weight in HHFNC group was 1.89 ± 0.28 mts and in CPAP group was 1.90 ± 0.28 mts. There was no significant difference in mean weight comparison between two groups.

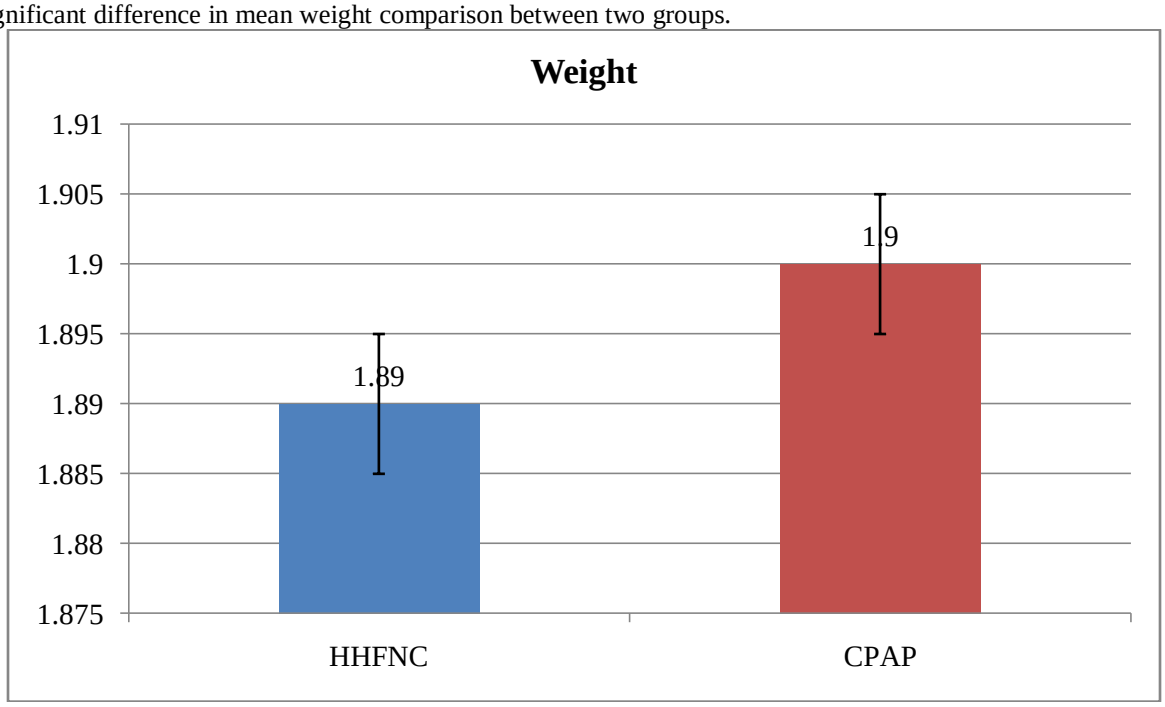

Figure 3:- Bar diagram showing Weight comparison between two groups.

Table 4:- Mechanical Ventilation comparison between two groups.

		Group			
		HHFNC		CPAP	
		Count	Column N %	Count	Column N %
Mechanical Ventilation	Yes	3	18.8%	6	37.5%
	No	13	81.2%	10	62.5%

Chi-square = 1.391, df = 1, p value = 0.238

In HHFNC group, 18.8% required Mechanical ventilation and in CPAP group, 37.5% required mechanical ventilation. There was no significant difference in mechanical ventilation between two groups.

However need for mechanical ventilation was high in CPAP group compared to HHFNC group between two groups.

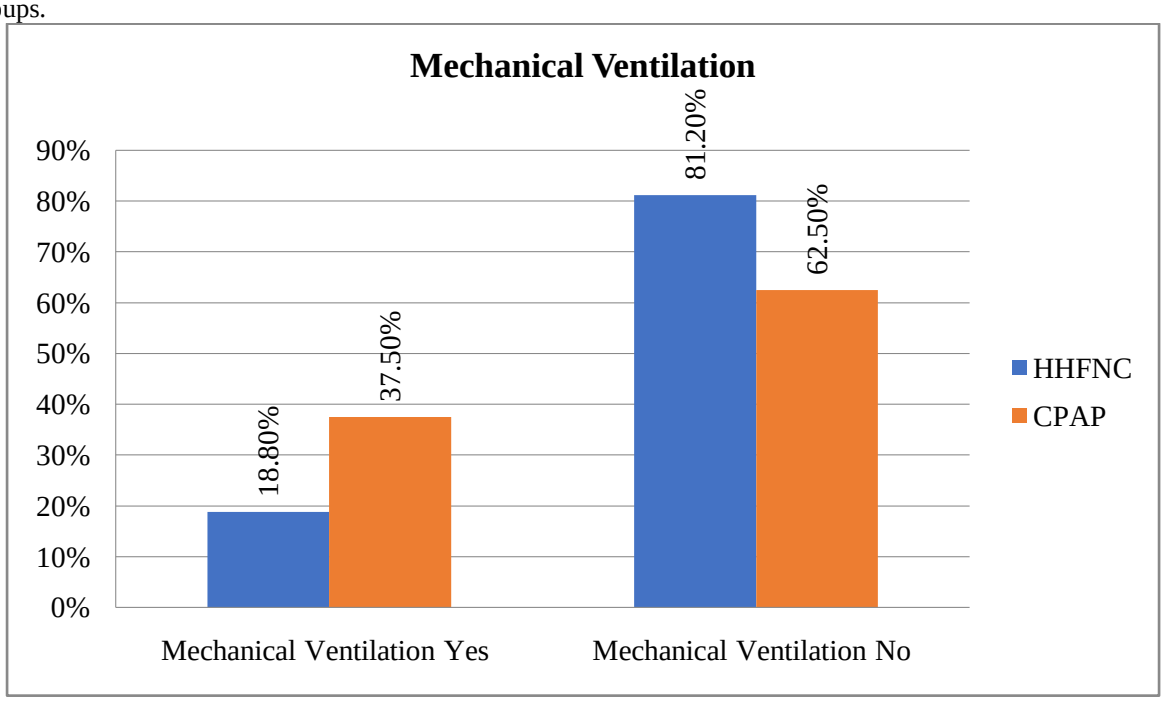

Figure 4:- Bar diagram showing Mechanical Ventilation comparison between two groups.

Conclusion:-

From our study, it can be concluded that HHHFNC as a primaryrespiratorysupportwas the best respiratorysupport when compared to CPAP as less number of infants required the conversion intomechanical ventilation.

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