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RESEARCH ARTICLE

THE ROLE OF CRANBERRY IN PREVENTION OF URI TRACT INFECTIONS.

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Abstract

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Introduction:-

"CRANBERRIES " term derived from the contraction of "crane berry" the nickname of the bilberry flower which, when it withers, is similar in appearance to the head and neck of the sand crane , a bird the often feeds on the berries of this plant. The american cran berry (*Vaccinium Macrocarpon*) was historically used by north American Indians to treat Uti. Cran berry are composed of water(88%) organic acids (Including Salicylate) Vitamin C, fructose, flavonoids, anthocyanidins, catechins and triterpenoids.

UTI is a common problem in childhood and 2-8% of children experience UTI at least before 7 year's old. Recurrence is also observed frequently in these groups. Standard treatment for preventing UTI in recurrence in high risk children is administration of low dose antibiotics as prophylaxis. However systematic review shows that long term low dose antibiotics has low effectiveness in prevention of UTI. Therefore researchers are looking for other methods for this purpose. There are reports which suggest the role of cranberries in prevention of UTI.

Aim & Objective:-

This study was conducted to clear role of cranberries in prevention of UTI cases.

Material And Methods:-

The Study was conducted in J.L.N.M.C.H. Bhagalpur Bihar , India on Total 120 Patients between December 2016- December 2017. Exclusion criteria of study were Neurogenic bladder , Hemodynamically Unstable Patients and patients with coagulopathy. All included patients had sterile urine culture and none of them had symptoms of UTI like burning Micturations, fever hematuria , Suprapubic pain etc. These Patients were randomized into two groups. Group-1 had 60 patients who received tablets of cranberry extract dose is 300 mg B.B for three months. Group-2 also had 60 patients who not received tablets of cranberry extract (Placebo group) . All these 120 patients were followed upto 3 months and symptoms of UTI were observed. Any patients who developed signs of UTI were confirmed by urine culture and treated with appropriate antibiotics accordingly.

Results:-

A total of 120 patients having history of recurrent UTI were included in our study. The mean age of patients in group 1 was 51 years and in group 2 were 53 years . There was no statistically difference between the age of two

groups . There was 42 males and 18 females in groups 1 and there were 38 males and 22 females in group 2 . Both the groups were comparable to sex ratio . 18 patients in group 1 were diabetic and 22 patients in group 2 were diabetic. 11 patients were on foley's catheter in group 1 and 9 patients in group 2 were on foley's catheter.

Table:-1

	GROUP-I	GROUP-II
Total No. of .Patients	60	60
Mean age (in years)	51	53
Male	42	38
Female	18	22
UTI episodes	12	36
Diabetic patients	18	22
Foley catheterized patients	11	9
Types OUBACTERIA		
E.coli	8	20
Klebsiella	2	5
Proteus	2	4
Pseudomonas	0	2

TABLE:- Showing that in group-1 total 12 patients developed episodes of UTI within 3 months. In group-2 total 36 Patients developed episodes of UTI. Within 3 months. The difference in occurrence of UTI between two groups was statistically significant ($p < 0.05$).

Table:-2

	UTI in groups -I	UTI in group -II
Total No of Pt	12	36
Male / Female	4/8	10/26
Diabetics	4	9
Foley Catheterized	2	7
Lower/upper Uti	11/1	28/8

Discussion:-

UTI has become a major burden of global health one important property of E.Coli is its adherence to host tissue. The main protein for this phenomenon is adhesion protein. Bacterial adhesion is accomplished by the binding of lectins exposed on the cell surfaces of these fimbriae to complementary carbohydrates on the host tissues. Pili are small filaments which help in adherence of Bacteria. The mannose sensitive pili , Called type-1 pili, permit bacterial adhesion to the urothelium. The fimbriae are inhibited by fructose present in cranberries. More virulent strains of E.coli have p-fimbriae (Pyelonephritis fimbriae.) which binds to glycosphingolipids of the lipid. double membrane of renal cells, leading to renal parenchymal invasion. The current hypothesis is that cranberries work principally by preventing the adhesion of type-1 and P-fimbriae strains and preventing infection . Fructose prevents adhesion of type-1 fimbriae and proanthocyanidins (PAS) inhibits the adherence of P-Fimbriae. Another mechanism of cranberry is the in vitro reduction in the expression of P-fimbriae in E.coli by changing the conformation of surface molecules. Lavigne et al demonstrated that cranberries can decrease the virulence of E.coli strains.

Haverkorn and Mandigers evaluated the use of cranberry by elderly patients and shown that there were fewer instances of bacteriuria during the cranberry period than during the control period supporting a moderately preventive role for cranberry juice. Kontiokari et al did an open randomized controlled trial shown women using cranberry juice Experienced lower recurrences of UTI even after stopping the treatment . Stothers et al shown that after one years of treatment 32% of placebo recipients had experienced > 1 UTI during the year compared with 20% in the cranberry juice group and 18% in the cranberry tablet group wallker et al also shown that patients using cranberry capsules (400 mg) having less UTI episodes than Placebo group.

Table -3 Summary of Perspective studies evaluating prophylaxis of urinary tract infection (UTI) on bacteriuria.

Study	YEAR OF STUDY	METHOD	POPULATION	INTERVENTION	OUTCOME
Haverkorn and Mandigers (39)	1994	Ouasi randomized Cross-over	38 elderly men and women (17 finished the study)	15 mL of cranberry juice mixed with water b.i.d.vs. water,each for 4 weeks	7 of 17 patients had reduction of bacteriuria during cranberry period
Avorn(38)	1994	Quasi randomized placebo-controlled, double-bind	153 elderly women	300mL of cranberry juice cocktail vs. placebo for 6 months	Bacteriuria and pyuria were significantly reduced: 28% of samples from placebo recipients vs. 15% of samples from cranberry patients
Foda(37)	1995	Randomized, single-bind, cross-over	40 children with neurogenic bladder (21finished)	Cranberry cocktail. 15 mL/kg/d, vs. water each for 6 months	No benefit in preventing UTI or bacteriuria
Dignam et al. (36)	1997	Nonrandomized, historical controls	538 nursing home residents	220 mL of cranberry juice or 6 capsules with cranberry extract per day	Compared with historical controls,incidence of UTI significantly reduced, from 27 cases per month to 20 cases per month
Walker et al (35)	1997	Remdimized, double blind cross-over	19 women with recurrent UTI (10 finished the study)	Cranberry capsule with 400 mg of cranberry solids vs. placebo, each for 3 months	Cranberry effective in preventing UTI of 21 UTIs 6 UTIs were in the cranberry group and 15 were in the placebo group
Schlager (34)	1999	Randomized, double-blind,cross-over	15 children with neurogenic bladder	300 ml cranberry concentrate vs. placebo each for 3 months	No benefit in preventing UTI of bacteriuria
Kirchhoff et al. (33)	2001	Nonrandomized, controlled	2 geriatric units	Cranberry juice vs. usual mixed berry juice, mean stay. 4 weeks	no effect on UTI
Kontiokari et al (32)	2001	Open, randomized	150 women with previous UTI	50 mL cranberry lingonberry concentrate vs. 100 mL lactobacillus	A significant reduction in UTI 16% for cranberry vs 39% for

				drink vs. no intervention for 6 months	lactobacillus and 36% for no intervention
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Conclusion:-

Future trials should also assess patient's acceptability of treatment many patients having unacceptable taste and caloric load in long term treatment. Capsules of cranberry could be a better alternative cost is another issue that affects patient's uptake of treatment. The potential of cranberry products to act as a non-antibiotic alternative for preventing UTI could have great public health significance. There fore reducing the antibiotics prescribed for UTI. As the antimicrobial resistance continues the climb, the time came to recognize the importance of further cranberry research.

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