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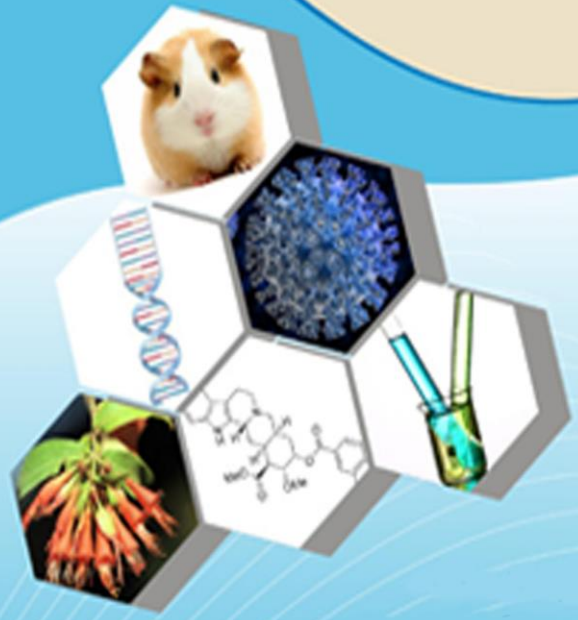

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FECAL MICROBIOTA TRANSPLANTATION

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ABSTRACT:

FMT is a method used to directly change the recipient's gut microbiota to normalize the composition and gain a therapeutic benefit for treating recurrent and refractory Clostridium difficile infections . Clostridium difficle colitis is the inflammation of the colon results from the disturbance in normal, healthy bacteria in the colon, often as a result of excessive use of antibiotics. Symptoms of clostridium difficle colitis are diarrhoea, nausea, bloating, blood in stool, high body temperatures, signs of dehydration such as dry mouth, headache, loss of appetite and weight loss. FMT can be done through colonoscopy, a procedure that enables a doctor to examine the colon using a long, flexible tube with a camera and light on the end . The stool sample is placed in the tube, or colonoscope, and the colonoscope is inserted into colon through the anus . It slowly reaches the colon . Once it reaches the end of the colon, the doctor releases the stool sample . It showed a success rate of 88% after a single FMT whereas 93% after multiple FMTs. Most of the short term risks are mild and known to be associated with delivery methods. Stool banks safely collects, stores and distributes the stool samples for the treatment of CDI, and also participates in the research studies under stern protocols .

Keywords :-Transplantation, FMT, Clotridium difficile, Microbiota dysbiosis, Colonoscopy, Inflammatory bowel syndrome .

Introduction:

Transplantation is a medical procedure in which a cell, tissue or an organ is removed from one body and placed in the body of a recipient, to replace a damaged organ.Organ donors may be living, brain dead or dead via circulatory death (1).

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Types of Transplantation :-

1) Auto transplantation :-It is a type of transplantation in which organs/tissues/proteins are transplanted within the same body[(2)]

2) Allotranaplant :-It is the type of transplantation in which cells/tissues/organs are transplanted from a donor to a recipient within the same species.Allografts are referred as "homostatic", they remain biologically inert when transplanted.[(3)]

3)Xenotransplantation:-also called as heterologous transplant, it is a type of transplant in which the living cells/tissues/ organs are transplanted between different species.

The transplanted cells/tissues/organs are known as xenografts (or) xenotransplants.

4) Domino transplants :- In people with cystic fibrosis (CF), where both lungs need to be replaced, it is a technically easier operation with a higher rate of success to replace both the heart and lungs ABO-incompatible transplants the recipient with those of the donor. As the recipient's original heart is usually healthy, it can be transplanted into a second recipient thus making the person with CF a living heart donor[(4)].

5)ABO-incompatible transplants:-Because very young children (generally between 12 -24 months doesn't have a well-developed immune system, so it is possible for them to receive organs from incompatible donors. This is known as ABO-incompatible transplantation. Graft survival and people's mortality are approximately the same between ABOi and ABO-compatible (ABOc) recipients, While focus has been on infant heart transplants, the principles generally apply to other forms of solid organ transplantation[(5).]

6) Organs and tissues transplanted:-

Organs:

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- Chest
- Heart
- Lung
- Thymus
- Abdomen
- Kidney
- Liver (deceased-donor, which enables donation of a whole liver; and living-donor, where each donor can provide up to 70% of a liver)
- Pancreas (a severe type of diabetes occurs if a live person's entire pancreas is removed)
- Intestine
- Uterus (deceased-donor only) [6]
- Testis - deceased-donor and living-donor
- Hand (deceased-donor only)
- Cornea
- Skin (autograft) and face transplant
- Islets of Langerhans (deceased-donor and living-donor)
- Bone marrow or matured stem cells (living-donor and autograft)
- Blood transfusion (living-donor and autograft)
- Blood vessels (autograft and deceased-donor)
- Heart valve (deceased-donor, living-donor and xenograft [porcine/bovine])
- Bone (deceased-donor and living-donor)

7) Fecal Microbiota Transplantation

Fecal microbiota transplantation (FMT) is the transplantation of a treated sample of fecal matter from a healthy donor into the intestine of a recipient in order to directly change the recipient's microbial composition and offer a health benefit[7]

USES OF TRANSPLANTATION:-

• avoiding medical procedures such as dialysis

• living a longer life

• improves the quality of life.

• correcting congenital disabilities.

• quick treatment and less no of medication in needed to be taken by patient

FECAL MICROBIOTA TRANSPLANTATION (FMT)

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FMT is a procedure that delivers healthy human donor stool to a gut of another person to restore their balance of bacteria . This is an experimental therapy used to treat a repeated infection from the bacteria Clostridium difficile .

MICRO ORGANISM	NAME	FUNCTION
1. BACTERIA	1. Peptostreptococcus sp.,	Induces intracellular cholesterol biosynthesis in colon cells to induce proliferation and causes dysplasia in mice.
	2. Eubacterium sp.,	Carry out bile acid and cholesterol transformations in the gut , thereby contributing to there homeostasis.
	3. Lactobacillus sp.,	Protect the intestinal barrier from infection by promoting mucous production and secreting the anti microbial substances such as bacteriocins and H_2O_2 which inhibit the growth of the pathogens, by modulating the host's.
	4. Clostridium sp.,	Provides essential nutrients for the colonic epithelial cells and energy for colonocytes, induces T cells,and also have an anti- inflammatory effect by enhancing epithelial barrier integrity.

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	5.Escherisia coli	Helps to maintain the balance of normal intestinal flora(bacteria) against harmful bacteria and synthesize or produce some vitamins .
2.FUNGI	1. Candida sp.,	Promote gut health and nutrient absorption and also aid digestion. It is a yeast if it is in too much conc. in the body or on the skin and cause infection.
2. **VIRUS**	1. Norovirus	Uses bile salts to escape anti-body recognition while enhancing receptor binding.
	2. Rotavirus	Primarily infects mature enterocytes in the intestinal epithelium causing Villus atrophy,enhanced epithelial cell turn over and apoptosis.
	3. Cytomegalovirus	Hematochezia and shows non specific symptoms including diarrhea, Severe pain in abdomin, rectal bleeding and loss of weight.
4 .PROTOZOANS	1. Entamoeba histolytica	Live in the intestine without causing damage to the intestine .
	2. Giardia intestinalis	These parasites lives in the intestine and release in stool.
	3. Cyclospora cayetanenesis	An important cause of water and food borne disease.

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4. Cryptosporidium sp., It is a leading cause of water borne disease among humans .

USES OF FMT :-

1. FMT mainly used to treat persistent infection with c.difficiles.
2. Helps to restore essential metabolites used for host metabolism.
3. Decrease the fat accumulation in the liver by improving the gut microbiota dysbiosis

ADVANTAGES:

- Less invasion and high patient acceptability.
- Rapid response and cure rate of 90-95%

DISADVANTAGES:

- Pathogen transfer
- Transient result
- Stool toxicity
- Difficult in reproduction
- Diarrhea
- Abdominal pain (or) cramps
- Low grade fever
- Bloating
- Flatulence
- Constipation
- Nausea

Who needs FMT ? :

- FMT may be an option for people clostridium difficile infection in their colon.

Conclusion :- FMT has a potential therapeutic value for the treatment of ulcerative colitis as it changes the abundance of bacterial flora and improves the score for diarrhea ,abdominal pain and mucous membrane lesions in patients with disease .

Procedure:

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The FMT procedures depends upon on the transplant delivery system. If the procedure is done through colonoscopy, the donor stool sample is mixed with saline solution and transplant is prepared . The fecal transplant is 100% liquid.

Once the FMT sample is prepared, the patient is anesthetized and then the doctor starts the colonoscopy procedure . A long flexible tube with a camera called an endoscope or colonoscope is inserted through the anus into the colon . After reaching the colon, the colonoscope sprays fecal transplant solution onto the walls of the colon.

After the procedure,your doctor might have you take anti-diarrhea medication before you leave, to help keep the fecal transplant in your colon so it can do its work.[8]

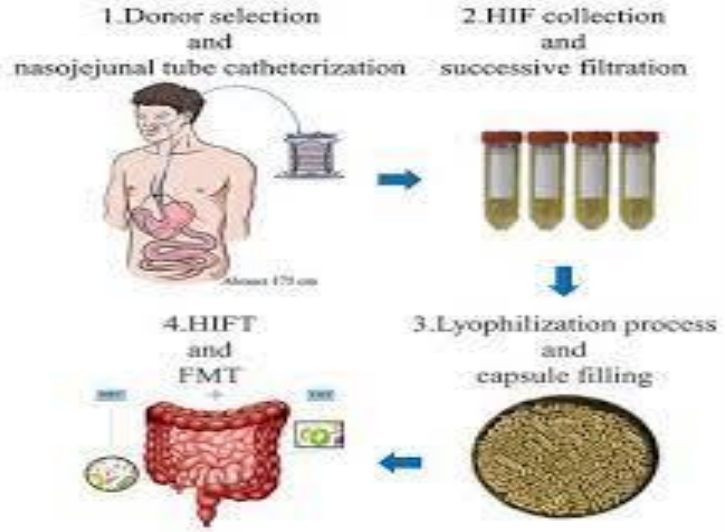

Fig: procedure for FMT[9]

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