Nylon was the first polymer synthesized and the first pure synthetic fiber manufactured as hernia prosthetic in 1935. The initial reports of its use as prosthetic dates back to 1948 and 1959. In the last two decades numbers of manufacturers have developed many different kinds of products, majority of which are made of synthetic materials. To-date there are about 37 manufacturers and about 166 various products available in the market. It reflects the fact that surgeons and manufacturers are still looking for an ideal mesh. At present there is not a single mesh available in the market which is uniformly suitable for all varieties of hernia repair in every patient.

Various classifications have been proposed based on the biomaterial used and the weight of the prosthetic. The prosthetics are classified on the basis of weights as ultra light weight (< 35 g/m²), light weight (35 < 70 g/m²), standard (> 70 < 140 g/m²) and heavy weight (> 140 g/m²).

According to a recent classification proposed, there are four types of prosthetics available based on the basis of the biomaterial with which they are manufactured. The mesh could be a simple prosthetic made of one pure biomaterial with the same texture on sides, mono or multifilament with or without drugs included. The second type is composite prosthetics; these are made of two or more different layers, one of which is simple while the other are non- absorbable or absorbable. Mesh could be made of a combination of two materials knitted or woven together, where either both materials are non-absorbable or only one filament is absorbable and the fourth type are biological.

There are many properties of a prosthetic which are important to consider repairing an incisional hernia. This include weight, thickness, tensile strength, burst strength, tear strength, elasticity, suture retention, pore size, percentage porosity and yarn diameter. The ideal mesh for the repair of incisional hernia would be strong, durable, resist infection, be immunologically inert, have dual surface properties such that the abdominal wall side will facilitate tissue ingrowth and incorporation into the fascia, muscle and the peritoneal side will minimize adherence to the visceral organs and prevent ingrowth of the tissues.

When a mesh is used at a position where direct contact with the bowel is unavoidable like intraperitoneal repair of ventral and incisional hernia, repair of parastomal hernia or repair of hiatus hernia and pelvic organ prolapsed treatment, there is always a risk of causing erosions to the bowel and development of entero-cutaneous fistula. In such a situation, mesh is required which has got at least on one side a layer of antiadhesive barrier of some kind. Hence, there is a rapidly increased use of composite mesh in the last few years. The absorbable barrier layer in these composite meshes are made of oxidized regenerated cellulose, omega-3 fatty acid, or collagen hydrogel. This collagen could be of animal origin. This protective layer reduces the formation of intraperitoneal adhesions.

When the mesh is used in a situation where the operative field is contaminated or potentially contaminated, then the use of synthetic mesh could result in a disastrous outcome and very often ultimately the mesh will need to be removed at some stage. Post-operative wound infection where a mesh has been implanted would result in higher rate of recurrence of incisional hernia.

Most of the synthetic meshes do contract, some more than others. It is not surprising for the surgeons when operating on the recurrent incisional hernia to find that the size of the mesh is half of the size when implanted at the index operation. Hence, a reasonable good margin of overlap is required, usually about 3-5 cm. This results in need of a bigger size mesh.

Along with the development of laparoscopic repair of internal and external hernia other recent development in the field of hernia surgery is the development of prosthetics which are derived from natural tissues called the “biologics”. The collagen based biologics have been produced since 1980s. The acellular collagen matrix use in these prosthesis is slowly degraded and replaced by fibrocollagenous tissue of the host. The source of these materials could be human dermis, porcine dermis, porcine small intestinal submucosa or bovine peri-cardium. After harvesting, these materials are made functionally acellular to prevent foreign body response, while still maintaining their extracellular collagenous structure that allows for the host tissue ingrowth. Some of these are then further processed using cross linking technique to minimize the enzymatic degradation of the graft which allows more time to deposit the fibro-
collagenous tissue and remodel the prosthetic into a strong native tissue. These prosthetics are sterilized in various ways including gamma radiation and with the use of ethylene oxide gas or hydrogen peroxide. The processing of these meshes for production is by and large a proprietary procedure, making it difficult for surgeons to access all the information about the final products.

The biocompatibility of these biologics help in rapid vascularisation and migration of host immune cell. Hence, these prosthetics are less prone to get infection and even if infection sets in the neo tissue it can potentially be treated with antibiotics. These meshes are usually soft and pliable, which potentially decreases the risk of erosion and fistula formation if they are in contact with bowel and less painful if used at the anterior abdominal wall.

Low risk of infection, graft rejection and complications seem to be an additional advantage of this new innovation. These products are expensive. They are relatively new in the market compared to the synthetic mesh; hence, the available data with long-term results and level-I evidence is limited. In general, the use of biologics is very selective and will remain selective for quite some time. Further studies with large number of patients and a longer follow-up are required to make an informed decision to use the appropriate prosthetic according to individual patient's requirement. The FDA reported complications of these materials warrant further caution and sound surgical judgment.

Dietary consumption of porcine and bovine material is not permissible for the people of certain faiths. The non-dietary consumption of porcine is controversial according to some Muslims. In the presence of alternatives to porcine prosthetics i.e. the availability of the human dermis and bovine products, the acceptability of the porcine dermis will be poor in Pakistan due to biomedical and ethical reasons. Knowledge of religious and cultural preferences regarding biologic mesh assists the surgeons in obtaining a culturally sensitive informed consent for procedures involving acellular allogeneic or xenogeneic grafts. Patient's religious or other belief may be fundamental to their sense of well-being and they have all the rights to know what type of mesh is used for their treatment. At the same time, as a part of informed consent, they should be informed about the options of alternative treatment. A doctor should not assume on the basis of his or her belief and preference that patient would accept or not accept an implant that contains product of animal origin.

In order to meet the local requirements, the surgeons from United Kingdom have used the mosquito nets for the repair of hernia in Africa. There is a need to promote research at local level to develop biologics which are cost effective and acceptable to the community.

REFERENCES