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Short Communication

Histological Assessment of Collagen Deposition within Enterocutaneous Fistula Tracts Secondary to Diverticulitis

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Enterocutaneous fistulas (ECF) are defined as abnormal communications between the gastrointestinal tract and the skin. The majority of ECFs are iatrogenic in nature (~85%). Surgical procedures such as those for intra-abdominal malignancy, inflammatory bowel disease (IBD), diverticulitis and repeated explorations for adhesions are at a higher risk of resulting in an ECF [1-5]. ECFs can also occur spontaneously, often secondary to inflammatory bowel disease, perforated diverticulitis, radiation enteritis, trauma, perforated tumours and intra-abdominal sepsis [6,7].

The mainstays of ECF management include control of sepsis, improved nutrition, correction of fluid and electrolyte balance, optimum wound and skin care and planning the right operation at the right time. Surgical mortality and morbidity remain high and re-fistulization rates are between 15% - 25%.

Colonic diverticular disease is a common phenomenon predominant in western society affecting 65% of people over the age of 65 years and characterised by the outpouching of colonic mucosa due to acquired herniation through the colonic wall [8]. Several factors play a role in the pathophysiology and formation of these diverticulae including dietary factors, an ageing population, disorders in colonic motility and most importantly structural changes within the colonic wall itself with weakening of the extracellular matrix and changes in the type and content of collagen and elastin [9-11].

Wess., *et al.* histologically assessed colonic tissue in patients with diverticulitis and found that the submucosal layer composed mainly of collagen fibrils plays an important role in maintaining the viscoelastic integrity of the colonic wall. Increase in cross-linking was noted in elderly patients with diverticulosis which leads to colonic rigidity and reduced flexibility [10]. The histochemical and ultrastructural characteristics of the common collagen types has been described (Table 1).

Collagen type	Type I	Type III
Maximum level of physical organization attained	Bundles of thick (2-10μm) fibres	Individual fibres (0.5 - 1.5 μm diameter)
Histological features (Picro-sirius-polarization method)	Closely packed, thick, non-argyrophilic, strongly birefringent, yellow or red fibres	Loose network of thin, argyrophilic, weakly birefringent, greenish fibres.
Ultrastructure	Densely packed, thick fibrils (75 μm) with marked variation in diameter	Loosely packed, thin (45 μm) fibrils with a more uniform diameter

Table 1: *Histochemical and ultrastructural characteristics of the common collagen types [14].*

The content and ratio of collagen types I and III are responsible for the tensile strength and mechanical integrity of connective tissue [12]. Mature collagen type I was significantly lower and immature collagen type III higher in the complicated diverticulitis cohort of patients as compared with controls leading to a lower collagen I:III ratio [10,13].

No study to date has directly assessed the histological changes associated with patients who have developed ECFs secondary to diverticulitis and whether this predisposes to poorer healing and a possible higher rate of re-fistulization. In this context, there is a need to assess the histological structure and the morphology of collagen deposition in colonic tissue from patients who have undergone resections for diverticulitis and diverticular ECFs. Specific histological features should be looked at in order to ascertain whether the type of collagen and its distribution contribute to the development of ECFs.

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