Chapter I

INTRODUCTION AND AIM OF WORK

Keloid and hypertrophic scars are abnormal wound healing responses in predisposed individuals. These fibrous growths result from abnormal connective tissue response to trauma, inflammation, surgery, or burns and occasionally seem to occur spontaneously. Both keloid and hypertrophic scars are characterized by abundant deposition of collagen and glycoprotein. However, distinguishing keloid from hypertrophic scars is a challenging clinical issue.

Clinically keloid are distinguished from hypertrophic scars in that keloid extends beyond the original wound, and may has irregular extensions looks like crab claw **(Figure 1.1** from **A to H)** and rarely regress; whereas hypertrophic scars **(Figure 1.2)** remain within the confines of the original wound and often spontaneously regress. These fibrous growths and are frequently occur in blacks while Caucasians and albinos are least affected.

The word keloid is derived from the Greek word "**chele**" meaning crab's claw and the suffix "**oid**" meaning like **(Conway *et al*., 1960; Child *et al*., 1999).** Keloids were first described centuries ago in the Smith Papyrus **(Rockwell *et al*., 1989).**

In spite of a vast number of researchers trying to clarify precise criteria upon which they classify and differentiate different forms of post traumatic or post wounded scaring, yet contradictory and wide diversity of data were reported in literature. The objectives of such researches also widely varied; Most were interested in differentiation between keloid and hypertrophic scars for sake of

accurate diagnosis to choose the most suitable curable or therapeutic methods whether, medical or surgical. Other scientists were interested in investigation of pathogenesis of scar formation especially hyper active fibroblasts and the mechanism of accumulation of large amount of abnormal collagen that followed post operative wound or minor trauma like ear piercing or even without associated wounds that called spontaneous keloid.

The presence of special types of inflammatory or immune cells especially lymphocytes, macrophages and increasing number of mast cells and their relationship to active fibroblasts **(Boyce *et al*., 2001; Barnhill and Crowson, 2004; Moyer *et al*., 2004)** were among the amazing and interesting histological changes that make great conflict to most investigation concerning, which of these cells were the initiators of starting the process of excessive fibrogenesis **(Martin and Leibovich, 2005)**, the abnormal appearance of newly formed collagen and the absence of remodeling process.

Available histological studies describing such changes in abnormal scars are scarce, and non integrated and most concentrated on chemical mediators regulating the relationship between different types of cells, reported to have a relationship to either keloid or hypertrophic scar formation, without presenting detailed description about their distribution, cellular relationship or associated vascular changes in the vicinity of excess collagen accumulation.

The main objectives of the present study was to describe vascular changes, the nature and types of inflammatory or immune cells such as (lymphocytes, macrophages and mast cells) predominate in abnormal scars and that may have a role in fibroblast activation as previously reported in literature. Also to study the main features of collagen fibers and their pattern of accumulation.

Hematoxylin & Eosin (H & E) and Masson trichrome (MT) stained paraffin sections were used to describe general architecture of collagen deposition in both keloid and hypertrophic scars compared to normal human foreskin. Immunohistochemical techniques were applied to paraffin sections for detection of lymphocytes, macrophage (using specific kits). Toludine blue (TB) stain was used to confirm the morphology of mast cell granules.

Scanning electron microscopy was used to show the three dimensional appearance of those abnormal scar and correlate with H & E sections prepared from the same samples.

In vitro study using cultured fibroblasts from normal foreskin, keloid and hypertrophic scars, were studied morphologically, morphmetrically, and by scanning electron microscopy to show their characteristic features. The results were discussed in view of available previous literature, hoping for finding precise parameters to differentiate different abnormal scars that may help identifying initiating factors for determining better therapeutic, control and treatment.