

Biomarkers in uterine leiomyomas and their clinical significance

Leiomyomas are the most common benign smooth muscle uterine neoplasm of the reproductive age group.^[1] They are steroid-dependent tumors. Leiomyomas are diagnosed by clinical examination, ultrasonography, and histopathology examination of hysterectomy specimens or excised myomas.^[2] Biomarkers are biological compounds that can be obtained from serum or other easily accessible tissues. They are the reflection of physiology or pathology.^[3] Biomarkers which are raised in leiomyoma are prolactin, serum total protein, S. HLA-G, VEGF, Ghrelin, lactate dehydrogenase A, hypermethylated death-associated protein kinase, CA-125, hematopoietic growth factors, human epididymis protein 4, proteomics, and gonadal hormones.

Prolactin is a protein hormone involved in various mammalian physiologic actions such as lactogenesis. It is also expressed in other tissues including uterine leiomyomas.^[4] It is raised in uterine leiomyomas.

Serum protein is lower in patients with leiomyoma probably because these patients are predisposed to abnormal uterine bleed and menorrhagia.^[2]

S human leukocyte antigen G (HLA-G) is an antigen of the immune system which is also expressed in uterus. It is elevated in melanoma, ovarian, and breast carcinoma. Basta *et al.*^[5] demonstrated higher levels of HLA-G in patients with leiomyoma.

Vascular endothelial growth factor (VEGF) and hematopoietic growth factor – VEGF is an angiogenic peptide for the growth of tumors. Chen *et al.*^[6] evaluated raised serum VEGF in women with uterine leiomyoma. Similarly, hematopoietic growth factor, such as macrophage colony stimulating factor (M-CSF) and granulocyte colony stimulating (G-CSF), are raised in endometrial carcinomas and leiomyomas.

Ghrelin – It is secreted by the stomach. Markowska^[7] found raised levels of ghrelin in women with leiomyoma.

Lactate dehydrogenase A – It is involved in anerobic glycolysis, and its levels are raised in ovarian cancers and leiomyoma.^[8]

CA-125 is raised in ovarian carcinoma as well as in patients with endometrial carcinoma and other benign gynecological diseases such as endometriosis, pelvic inflammatory diseases, adenomyosis, and uterine leiomyomas.^[9]

Growth hormones – leiomyomas need hormonal milieu for their growth and maintenance as evident by molecular studies that leiomyoma exhibits more estrogen receptors than normal myometrium.^[2]

Conclusion

Biomarkers in leiomyoma are useful for diagnosis as well as for prognosis. There are a number of markers that are raised in leiomyoma uteri, however, ideally it should be sensitive, specific, and cost effective.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Access this article online	
Website: www.tjogonline.com	Quick Response Code 
DOI: 10.4103/TJOG.TJOG_46_16	

How to cite this article: Dayal S. Biomarkers in uterine leiomyomas and their clinical significance. *Trop J Obstet Gynaecol* 2017;34:76-7.

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