

Morphological Changes of Lymph Node Caused by Lymphadenopathies of Various Genesis and E.Coli in Experimental Model

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Abstract

The aim of our study was the comparison of accepted morphological changes with the cases of clinically and morphologically diagnosed: the acutest, acute and chronic lymphadenopathies in the experimental model of lymph node reactive lymphadenopathy. The findings of clinical cases are in definitive correlation with the changes developed in periods of time through experiment, that makes us to suppose that clinical classifications of lymphadenopathies based on their morphologic changes observed by classical staining technologies and represent reflection of stereotypical reaction, developing in period of time in lymph node in response to the injected antigen.

Keywords: *lymph node, antigen, changes*

The modern classification of reactive changes of lymph node or lymphadenopathies on one side is based on time-dependent rate of these changes' progress (the acutest, acute and chronic) and on the other side on the main changes of separate regions in lymph node (follicular, paracortical and etc.). Lymph node representing the whole morphologic construction, it is very difficult to imagine that morphologically on different antigen there occurs the immuno-reaction of various types (it is implied the classical morphology: hematoxiline-eosin staining method) along with separate hyperplasia of some region in lymph node. In this direction there exists the significant works in literature materials, but the question is still unsolved. It should be supposed that the prevailed hyperplasia of some region is the result of cell population redistribution existing in lymph node, that on its side must be depended on the results of presentation in one or another region of lymph node of different types.

According to the fact that practically there is no possibility to conduct the morphologic investigations on

lymph node in dynamics and classification of reactive lymphadenopathies is based on the extension of obtained data in different periods of time during the progress of various lymph node pathology in different patients, we have accepted as a working hyperplasia, that the above-mentioned classifications reflect the different stages of morphological dynamics of the same stereotypic reactions developed in lymph nodes (Z.Avaliani, G.Burkadze).

From the above-mentioned, the aim of our study was the comparison of accepted morphological changes with the cases of clinically and morphologically diagnosed: the acutest, acute and chronic lymphadenopathies in the experimental model of lymph node reactive lymphadenopathy.

To study this process have been used white rats, they were administered E.Coli hemolytic (ECH) (I group) and nonhemolytic (ECE) (II group) cell cultures intraperitoneally. The samples have been taken from the regional lymph nodes in 3, 24, 96 and 120 hours

respectively after antigen injection. Have been also investigated postoperational lymph nodes obtained for diagnosis within 2000-2002 years at the Clinic of Pathoanatomy at TSMU and on the background of adequate path.morphologic diagnosis they were divided into following groups:

III group - postinfective (the acutest) reactive hyperplasia (7 patients);

IV group - the acute reactive hyperplasia (15 patients);

V group - chronic reactive hyperplasia (15 patients).

The samples were fixed in 10% of neutral bupheral formalin solution (pH 7,2) and embedded in paraffin (Firm SHANDON). The paraffin slices were stained with common histological-hematoxylin-eosin method. The evaluation of morphogenetic changes have been conducted by morphometric method, through the special algorithm elaborated by us, consisted of all possible evaluating parameters of morphologic changes of lymph node. The results of experimental study in 3 hours after antigen injection in animals of primary group (hemolytic cell culture of E.Coli) showed that the total amount of primary follicles, area and number of lymphocytes were: $3,4 \pm 0,51$; $133,2 \pm 1,96$ $101,4 \pm 1,63$ respectively; the total amount of secondary follicles, area and size of reactive center, number of lymphocytes, macrophages and "staining bodies" were: $2,6 \pm 0,24$; $140,4 \pm 0,68$; $57,6 \pm 0,51$; $8,6 \pm 0,68$; $41,0 \pm 1,14$; $11,8 \pm 0,86$ respectively; the width of Paracortical layer, the number of lymphocytes and macrophages were: $17,4 \pm 0,37$; $122,8 \pm 2,15$; $42,0 \pm 1,10$ respectively; the width of medullar layer, number of lymphocytes and macrophages were: $7,2 \pm 0,19$; $44,8 \pm 1,74$; $23,4 \pm 1,60$ respectively.

In 24 hours after antigen injection - the total number of primary follicles, area and number of lymphocytes were: $4,6 \pm 0,51$; $64,9 \pm 0,58$; $69,8 \pm 2,46$ respectively; the amount of secondary follicles, area and size of reactive center, number of lymphocytes, macrophages and "staining bodies" were: $3,4 \pm 0,24$; $158,4 \pm 0,68$; $93,6 \pm 0,40$; $7,8 \pm 0,37$; $78,0 \pm 1,14$; $25,8 \pm 0,58$ respectively; the width of paracortical layer, the number of lymphocytes and macrophages were: $15,0 \pm 0,32$; $108,4 \pm 2,42$; $42,2 \pm 1,07$ respectively; the width of medullar layer, number of lymphocytes and macrophages were: $3,6 \pm 0,12$; $34,4 \pm 1,03$; $10,8 \pm 0,66$ respectively.

In 96 hours after antigen injection - the total number of primary follicles, area and number of lymphocytes were: $2,0 \pm 0,32$; $97,2 \pm 0,66$; $104,4 \pm 2,01$ respectively; the amount of secondary follicles, area and size of reactive center, number of lymphocytes, macrophages and "staining bodies" were: $4,6 \pm 0,40$; $234,0 \pm 1,58$; $118,8 \pm 0,86$; $12,8 \pm 0,66$; $69,2 \pm 1,07$; $14,0 \pm 0,84$

respectively; the width of paracortical layer, the number of lymphocytes and macrophages were: $15,0 \pm 0,32$; $114,4 \pm 1,12$; $61,6 \pm 1,75$ respectively; the width of medullar layer, number of lymphocytes and macrophages were: $4,5 \pm 0,16$; $12,2 \pm 0,58$; $7,6 \pm 0,16$ respectively.

Approximately in 120 hours after antigen injection all animals were dead.

In the animals of II group (E.Coli nonhemolytic cell culture) in 3 hours after antigen injection - the total number of primary follicles, area and number of lymphocytes were: $4,6 \pm 0,24$; $149,4 \pm 1,87$; $118,2 \pm 1,1$ respectively; the amount of secondary follicles, area and size of reactive center, number of lymphocytes, macrophages and "staining bodies" were: $4,6 \pm 0,40$; $228,6 \pm 2,73$; $43,2 \pm 3,36$; $8,2 \pm 1,02$; $46,4,2 \pm 1,21$; $8,6 \pm 0,68$ respectively; the width of paracortical layer, the number of lymphocytes and macrophages were: $7,5 \pm 0,67$; $110,8 \pm 1,16$; $29,4 \pm 1,6$ respectively; the width of medullar layer, number of lymphocytes and macrophages were: $5,7 \pm 0,56$; $29,4 \pm 1,54$; $46,2 \pm 1,39/3,11$ respectively.

In 24 hours after antigen injection - the total number of primary follicles, area and number of lymphocytes were: $3,1 \pm 0,32$; $72,2 \pm 1,9$; $96,3 \pm 1,91$ respectively; the amount of secondary follicles, area and size of reactive center, number of lymphocytes, macrophages and "staining bodies" were: $6,2 \pm 0,58$; $237,6 \pm 1,16$; $99,2 \pm 1,36$; $11,8 \pm 0,86$; $63,6 \pm 1,57$; $14,4 \pm 0,51$ respectively; the width of paracortical layer, the number of lymphocytes and macrophages were: $11,4 \pm 1,12$; $110,2 \pm 1,16$; $52,2 \pm 1,23$ respectively; the width of medullar layer, number of lymphocytes and macrophages were: $3,6 \pm 0,37$; $26,1 \pm 0,71$; $16,2 \pm 0,71$ respectively.

In 96 hours after antigen injection - the total number of primary follicles, area and number of lymphocytes were: $5,2 \pm 0,45$; $97,2 \pm 1,97$; $118,1 \pm 1,0$ respectively; the amount of secondary follicles, area and size of reactive center, number of lymphocytes, macrophages and "staining bodies" were: $3,4 \pm 0,24$; $227,2 \pm 1,14$; $52,2 \pm 1,36$; $8,6 \pm 0,68$; $62,1 \pm 1,30$; $10,8 \pm 0,66$ respectively; the width of paracortical layer, the number of lymphocytes and macrophages were: $4,8 \pm 0,3$; $116,0 \pm 1,2$; $39,8 \pm 0,73$ respectively; the width of medullar layer, number of lymphocytes and macrophages were: $3,6 \pm 0,37$; $20,4 \pm 1,08$; $26,8 \pm 0,66$ respectively.

In 120 hours after antigen injection - the total number of primary follicles, area and number of lymphocytes were: $4,2 \pm 0,37$; $109,8 \pm 1,61$; $109,4 \pm 0,92$ respectively; the amount of secondary follicles, area and size of reactive center, number of lymphocytes, macrophages and "staining bodies" were: $1,6 \pm 0,24$; $129,6 \pm 1,58$; $35,1 \pm 1,98$; $6,2 \pm 0,37$; $30,4 \pm 1,03$; $7,8 \pm 0,37$ respectively; the width of paracortical layer, the number of

lymphocytes and macrophages were: $5,6\pm 0,51$; $116,4\pm 0,51$; $33,4\pm 1,21$ respectively; the width of medullar layer, number of lymphocytes and macrophages were: $3,6\pm 0,37$; $8,0\pm 0,84$; $53,2\pm 1,23$ respectively.

In group III - the total number of primary follicles, area and number of lymphocytes were: $5,1\pm 0,45$; $73,8\pm 0,73$; $82,2\pm 1,56$ respectively; the amount of secondary follicles, area and size of reactive center, number of lymphocytes, macrophages and "staining bodies" were: $3,8\pm 0,37$; $262,8\pm 1,77$; $142,2\pm 0,37$; $25,1\pm 0,89$; $83,0\pm 1,41$; $16,2\pm 0,86$ respectively; the width of paracortical layer, the number of lymphocytes and macrophages were: $15,0\pm 0,32$; $114,4\pm 1,12$; $61,6\pm 1,75$ respectively; the width of medullar layer, number of lymphocytes and macrophages were: $2,4\pm 0,37$; $12,6\pm 0,32$; $17,1\pm 0,71$ respectively.

In group IV - the total number of primary follicles, area and number of lymphocytes were: $5,4\pm 0,51$; $69,0\pm 1,41$; $94,4\pm 2,71$ respectively; the amount of secondary follicles, area and size of reactive center, number of lymphocytes, macrophages and "staining bodies" were: $6,8\pm 0,86$; $63,9\pm 1,77$; $48,3\pm 2,09$; $10,8\pm 0,66$; $39,4\pm 1,89$; $9,6\pm 0,75$ respectively; in paracortical layer occurs fibrosis, the number of lymphocytes and macrophages were: $23,4\pm 1,63$; $9,6\pm 1,081$ respectively; the width of medullar layer, number of lymphocytes and

macrophages were: $4,5\pm 0,16$; $12,2\pm 0,58$; $7,6\pm 0,16$ respectively.

In group V - the total number of primary follicles, area and number of lymphocytes were: $2,4\pm 0,24$; $154,8\pm 1,69$; $99,8\pm 1,53$ respectively; the secondary follicles were not shown, the structures of paracortical and medullar layers were effaced.

The accepted actual data - primary follicles' number, area, number of lymphocytes in it, the secondary follicles' number, area, number of reactive centers in it, area, cell population, "staining bodies" (marker of apoptosis), the width of paracortical layer and cell population, medullar stems' cell population, show that at different hours of experimental model there takes place the quantitative and structural changes in different regions of lymph node, along with reliable changes in their population.

The analogous findings of clinical cases are in definitive correlation with the changes developed in periods of time, that makes us to suppose that clinical classifications of lymphadenopathies based on their morphologic changes observed by classical staining technologies and represent reflection of stereotypical reaction, developing in period of time in lymph node in respond to the injected antigen.

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Морфологические изменения лимфатического узла при разном генезе лимфаденопатии и инфицировании кишечной палочкой в условиях эксперимента

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Р Е З Ю М Е

Целью нашего исследования является сравнение морфологически и клинически диагностированных наиострейших, острых и хронических лимфаденопатий с морфологическими изменениями лимфаденопатией лимфатического узла, полученного в условиях эксперимента. Полученные результаты показывают, что в разные сроки эксперимента имеют место количественные и структурные изменения разных участков региональных лимфатических узлов с достоверными изменениями в них клеточного состава. Аналогичные данные клинических случаев находятся в определенном соответствии в условиях эксперимента с изменениями, развившимися во времени, что дает основание думать, что клинические классификации лимфаденопатии являются отражением стереотипной реакции лимфатического узла в ответ на действие антигена.

Ключевые слова: *лимфатический узел, антиген, изменения*