

*Short Reports***TYPES OF CONSTITUTION OF LYMPHATIC SYSTEM**

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**Introduction.** Constitution or general construction of lymphatic system (LSy) determines its reactions on all influences of surroundings, including pushes of lymph flow, consists in segmentary organization of LSy. It is conditioned by topography (branching artery) and fold structure of walls (valvae) of lymphatic bud (LB). Thus I divide all LSy segments on 2 groups:

1) the general (common for LB and blood bud) or systemic;

2) the special (own for LB) or local – intervalvar [5, 6].

Own LSy segments unite with another components of general LSy segments and corporal neurovascular segments by means of connective tissue: LSy is the part of cardiovascular system and human body at whole. They have very changeable structure. It is distinguished different somatotypes as morphological manifestation of different types of human constitution. Thus it possible to distinguish corresponding types of LSy constitution, which embrace determine individual variants of structure (morphotypes) and physiological reactions of LSy. For example: different number and distribution of valvae on extent of LB with different construction, and, consequently, different number, length and allocation of the intervalvar segments with different sizes determine different variants of lymph transport – function of LB, including correlation of phasic and peristaltic forms of its contract activity, separate and combined contractions of neighbouring lymphangions, including their lymphoid variety – lymph nodes (LN). Thus number and distribution of valvae on extent of human thoracic duct (TD) depend from TD length and type of TD formation [5]. Passive movements (and morphogenesis) of LB are regulated by means of its surroundings [4, 5], for example, muscles: chyle cistern and lumbar crus of diaphragm are passive lymphatic heart (Haller A., 1765; Jossifov G.M., 1930) [3]. Parietal lymphangion of mesentery, which is intimately connected with muscular coat of intestine, look like chyle cistern [2].

**Typical anatomy of LSy.** Knowledges about it has important practical significance, particularly in surgery. Literature contains few informations about connection of structure of LSy or its part with human somatotype. D.A. Jdanov [3] didn't discover hard connection between degree of widen of LB and lowering of level of TD formation, which happen in connection with age visceral ptosis. I put up

row of forms of TD initial part on its principal projection on vertebral column (from top to bottom): simple confluence of 2 lumbar trunks (under acute angle) → simple confluence of 3 lumbar trunks («bunch»), narrow plexus of lumbar trunks → wide plexus of lumbar trunks → plexus of lumbar trunks with chyle cistern. The conclusion is forced upon one: lengthening and narrowing of human body are accompanied by magistralization of LB with decrease of number of vessels, but shortening and widening of human body – widening of LB by means of increase of number, branching and local widening of vessels to form plexus and cistern. Then people with dolychomorphyc bild (PDB) must have LB of «narrow» type (magistral form – simple confluence of lumbar trunks), but people with brachimorphyc bild (PBB) – LB of «wide» type (vast plexus of lumbar trunks with chyle cistern). Probably, it should be no hardly to connect one of three main forms of TD initial part with one of three main types of human constitution. By my investigations in human fetuses [4] and to judge by drawings of D.A. Jdanov [3], longitudinal disperse of lumbar LN increases in contrary direct. It is must be typical for PDB so as simple confluence of lumbar trunks.

M.S. Lisitsin (1922) [3] found sharp arch in cervical part of TD in adult peoples in connection with narrow thoracic inlet, but the flat arch, when the inlet was wide. According D.A. Jdanov [3], sharp arch in cervical part of TD predominates in PDB, sloping arch – in PBB. My conclusions by results of analysis of both selections:

1) in all ages shortening and widening of human body (PDB → PBB) accompany similar changes in TD, including lowering and flattening of arch in cervical part of TD to its complete reduction;

2) shape and topography of the arch depend from human somatotype in more degree, than from the sex.

Unstable connection of LSy construction with human somatotype is causing probably by:

1) insufficiency of investigated materials;

2) extensive individual variations in human development (genotype → phenotype) and the LSy, that is conditioned by many factors, including herencia and environment of its realization;

3) age changings, especially in fetuses and children, elderly and old mans;

4) imperfection of known classifications of human constitutions and somatotypes, methods of their determination. Types of LSy constitution are not worked out at all.

**Genetic aspects of the problem.** Anlage of lumbar LN occurs in human fetuses of 3d month, when secondary adhesions of peritoneum begin. Increasing of volume of the adhesions correlates with

increasing of number and level of placing of lumbar LN, level of confluents of lumbar trunks (with withdrawal from diaphragm), but decreasing of capacity of TD initial part. Cause of this is in the connection of both processes with variative growth of abdominal organs and setting of physiological hernia into abdominal cavity [4].

In the row of rodents (rat → rabbit → guinea-pig) I discover:

1) decreasing of their mobility and degree of development of their muscles. Media of TD and lymphatic collectors of shin contains 1 muscular layer in rat, but 2 layers in rabbit (compensation of deficit of energy of extravasal factors of lymph flow);

2) thoracic cage is always lesser than abdomen on their sizes (abdominal type of the build), and abdomen increases in connection with increasing of large intestine diameter. In guinea-pig walls of stomach and intestine are very thin, caecum reaches huge sizes, letting in volume only liver. It is caused consumption of many vegetable cellulose. Walls of lymphatic vessels in mesenterium of guinea-pig contain on 1 muscular layer more, than in rat and rabbit. Thus it possible to distinguish digestive and muscular types of constitution in rodents, extreme in their row. They are corresponded specific features of LSy construction: vast and thick plexuses of small lymphatic vessels and LN with weak development of chyle cistern in guinea-pig and contrary picture in rat [4] – disperse or loose and concentrated or compact morphotypes of LSy. They look like evrereal and leptoreal types of blood bud – wide and narrow regions of branching of vessels with slowed-up and intensive metabolism in macro- and microslanchnics. Herbivorous rabbit has more lymphatic plexuses and less LN, than omnivorous and quick rat.

I discovered heavy decreasing of volume and solidity of lymphatic plexuses in lumbar region and thoracic cavity of white rat after its birth. These plexuses usually accompany TD on all or most of its extent even in mature guinea pig, and the TD double on all or most of its extent.

**Clinic aspects of the problem.** Astenics and hyperstenics succumb to infections. It is may be to connect with hypofunction of lymphoid system. Different types of human constitution are characterized by principal development of different connective

tissues (CT) [1]: the astenic type – flabby reacting, thin, gentle CT (the reticular about sinuses of LN ?); the fibrous type (~ muscular) – dense CT (tendon of muscle near chyle cistern ?); the pastose, lypomatose (digestive) type – loose and adipose CT, inclined to delay of fluid (lymphatic plexuses ?). Hence tightening of surrounding CT (conductor of extravasal factor of lymph flow) leads to increasing of transport means of LB, including LN (compare compact, immune and fragmentary, transport types of LN).

**Conclusion.** Represented materials allow to mark the next parallels:

1) astenic constitution (PDB) – «narrow» morphotype of LSy, compact or magistral (by vessels), lymphoid or «immune» (? – increasing of number, level and area of placing of LN);

2) digestive, hyperstenic or pastose, lypomatose constitution (PBB) – «wide» morphotype of LSy, disperse or loose, capacious;

3) normostenic or muscular-fibrous constitution (PMB) – transport mesotype of LSy.

The mesotype of LSy gives off probably 2 extreme types of LSy constitution with reducing immunity – magistral or compact, responsive leptotype and disperse, pastose or capacious evritype, in which muscular tone reduce. This is compensated by growth of lymphatic plexuses – the nodal in astenics (compact, lymphoid form – network of sinuses in LN with their capacity function, widening to pump part of lymph in venous bud) and the vast, but loose vascular, often with chyle cistern in hyperstenics (disperse, capacity form).

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