Psoriasis Concomitant with Chronic Opisthorchiasis: Ultrastructural Changes in Cell Populations of Gastroduodenal Mucosa

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Pathological changes based on degeneration of epithelial structures predominantly with preserved typical cell differentiation, but with unstable epithelial secretory function were detected in biopsy specimens of gastroduodenal mucosa from patients with psoriasis associated with chronic opisthorchiasis. The progress of the disease led to atrophy of glandular components and augmented stromal sclerosis. The compensatory adaptive reactions were realized via hyperplasia and hyperfunction of preserved glandulocytes, appearance of mix-cells with polypotent secretory cycle, and high functional activity of capillaries.

Key Words: *psoriasis; opisthorchiasis; stomach; duodenum; biopsy; electron microscopy*

Chronic opisthorchiasis occupies a leading positions in the structure of regional pathology of the West Siberia and particularly of the Ob-Irtysh river basin [2,8,10]. Clinical picture of the disease is highly polymorphic: opisthorchiasis is often latent, running a long wave-like course with exacerbations and remissions. The disease predominantly involves the gastrointestinal organs. Opisthorchis invasion is often detected after development of grave complications [2,3] including dermatoses, the most frequent of which are psoriasis and allergic dermatoses [7].

Psoriasis is now regarded as a systemic disease ("psoriatic disease") [4,5,13] involving not only the skin, but also the viscera and locomotor system [12, 14]. Psoriasis runs a severe course with frequent relapses and is resistant to treatment in West Siberian region endemic for opisthorchiasis. Therefore, the study of association of two systemic diseases (chronic opisthorchiasis and psoriasis) is important for not only regional pathology of West Siberia, but also for understanding the pathogenesis of mixed disease.

We investigated ultrastructural changes in cell populations of the gastroduodenal mucosa in patients with psoriasis associated with chronic opisthorchiasis.

MATERIALS AND METHODS

Thirty-four clinical cases of psoriatic disease concomitant with chronic *Opisthorchis* invasion (20 men and 14 women aged 18-50 years) lasting for 1-38 years were examined. The diagnostic complex included clinical laboratory and instrumental methods. Fibrogastroduodenoscopy with spot biopsy of the mucosa from gastric fundus and pylorus and duodenal bulb was carried out in all patients in accordance with indications and prescription of the gastroenterologist.

Paraffin sections for light microscopy were stained with hematoxylin and eosin in combination with Perls reaction, after Van Gieson with post-staining of elastic fibers with Weigert resorcin-fuscine and after Giemza, and periodic acid-Schiff (PAS) reaction in combination with azur-eosin staining. Semithin sec-

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tions prepared from blocks embedded in epon-araldite mixture were stained with Schiff reagent and azur II. Ultrathin sections for electron microscopy were contrasted with uranyl acetate and lead citrate and examined under a JEM 1010 electron microscope.

RESULTS

Fibrogastroduodenoscopy showed signs of chronic gastritis, sometimes with focal atrophy of the gastric mucosa or erosive defects in the pylorus in the majority of cases. Signs of chronic duodenitis associated in some cases with the duodeno-gastral reflux, cicatricial deformities of the duodenal bulb or erosions of the duodenal mucosa were detected in 15 patients.

Light microscopy showed pronounced PAS-positive staining of surface epitheliocytes and signs of degeneration of glandular epitheliocytes in the fundus (Fig. 1, *a*). Electron microscopy showed that the epithelial barrier of the fundal mucosa consisted of morphologically homogenous cylindrical foveolocytes with dense cell-cell contacts; intercellular edema looking as multiple interdigitations was found in few cases. Epitheliocyte nuclei had oval shape with scalloped contour and were located near the basal membrane. They contained minimum marginal heterochromatin, the nucleoli looking as diffuse lumps were rarely seen. Surface epitheliocytes were characterized by high electron density of the cytoplasmic matrix and secretory granules (Fig. 1, *b*), which attested to disorders in the excretory cycle. Long twisted unevenly dilated and sometimes vacuolated profiles of the granular cytoplasmic reticulum and solitary elongated mitochondria were situated perinuclearly along the lateral plasmalemmas. Vesicular Golgi complexes with forming secretory granules located supranuclearly were seen in some cells.

Cells with moderate and low functional activity predominated in the population of fundal glandulocytes (epitheliocytes of fundal glands): the number of protein-producing complex elements and specific granules decreased in chief cells. In parietal cells, membrane structures of the secretory tubule were reduced and some mitochondria were characterized by reduced number of cristae and partial destruction. Mix-cells were often detected in all gland loci (Fig. 1, *c*). The cytoplasm of these cells apart from tubovesicular system of the secretory tubule and numerous mitochondria contained a well-developed protein-synthesizing compartment and solitary mucoid and/or zymogen granules. Like other glandulocytes, mix-cells were characterized by focal alterations of membrane organelles (vacuolation), partial cytoplasmic edema, the presence of solitary small lipid inclusions, and formation of scanty residual bodies.

Capillary walls of the fundal mucosa (Fig. 1, *d*) was thickened because of endotheliocyte hypertrophy and formation of numerous plasmalemma processes and because of basal membrane edema and collagenization. The majority of capillaries were surrounded by long cytoplasmic processes of proliferating pericytes. Numerous mononuclear cells were located perivascularly; mast cell degranulation increased capillary permeability.

Epitheliocyte population of the pyloric mucosa was much more polymorphic in comparison with the fundal part, which could be explained by, among other things, irregularity of the secretory process (Fig. 2, *a*) and the resultant heterogeneity of the cytoplasmic ultrastructure. Apart from cylindrical foveoles, there were cubic and flattened (atrophic) cells with different electron density of the cytoplasmic matrix (Fig. 2, *b*) and different content of organelles in the protein-producing and mitochondrial compartments. The pyloroantral zone sometimes contained foci of metaplastic transformation and slight dysplasia of the epithelium. The population of pyloric glandulocytes was characterized by ultrastructural polymorphism, due to cell atrophy and hyposecretion, on the one hand, and preserved functional activity, on the other.

In general, the glandular compartment of the gastric mucosa was changed because of degeneration in both fundal and pyloric parts. On the other hand, pyloric gland atrophy was observed in almost half of reported studies, while fundal gland atrophy was rarely observed.

Duodenal mucosa was characterized by degenerative changes of different degree in the epithelium (Fig. 2, *c*). Sometimes the imbalance between cell populations resulted from changes in the number of goblet cells, while disorders in cell differentiation (gastric metaplasia) were only occasionally seen. Brunner glands underwent degeneration: in some cases their number remained unchanged, while in others hyperplasia of glandular structures presented as large groups under and above the muscle plate. Ultrastructural organization of enterocytes in villi and cryptae indicated high functional activity of epitheliocytes in the majority of cases. Apical plasmalemma in epithelial cells (Fig. 2, *d*) forms dense regular microvilli, the cytoplasm contained numerous pinocytosis vesicles and small mitochondria with compact matrix; lysosomes and secondary phagosomes were sometimes seen.

Microcirculatory disorders in the gastroduodenal mucosa were associated with polymorphonuclear infiltration most pronounced in the pylorus and duodenum and minimum in the fundus. Small lymphoid aggregations and transepithelial leukodiapedesis were detected in the pylorus. Sclerotic changes in the stroma were seen in the majority of biopsy specimens; the

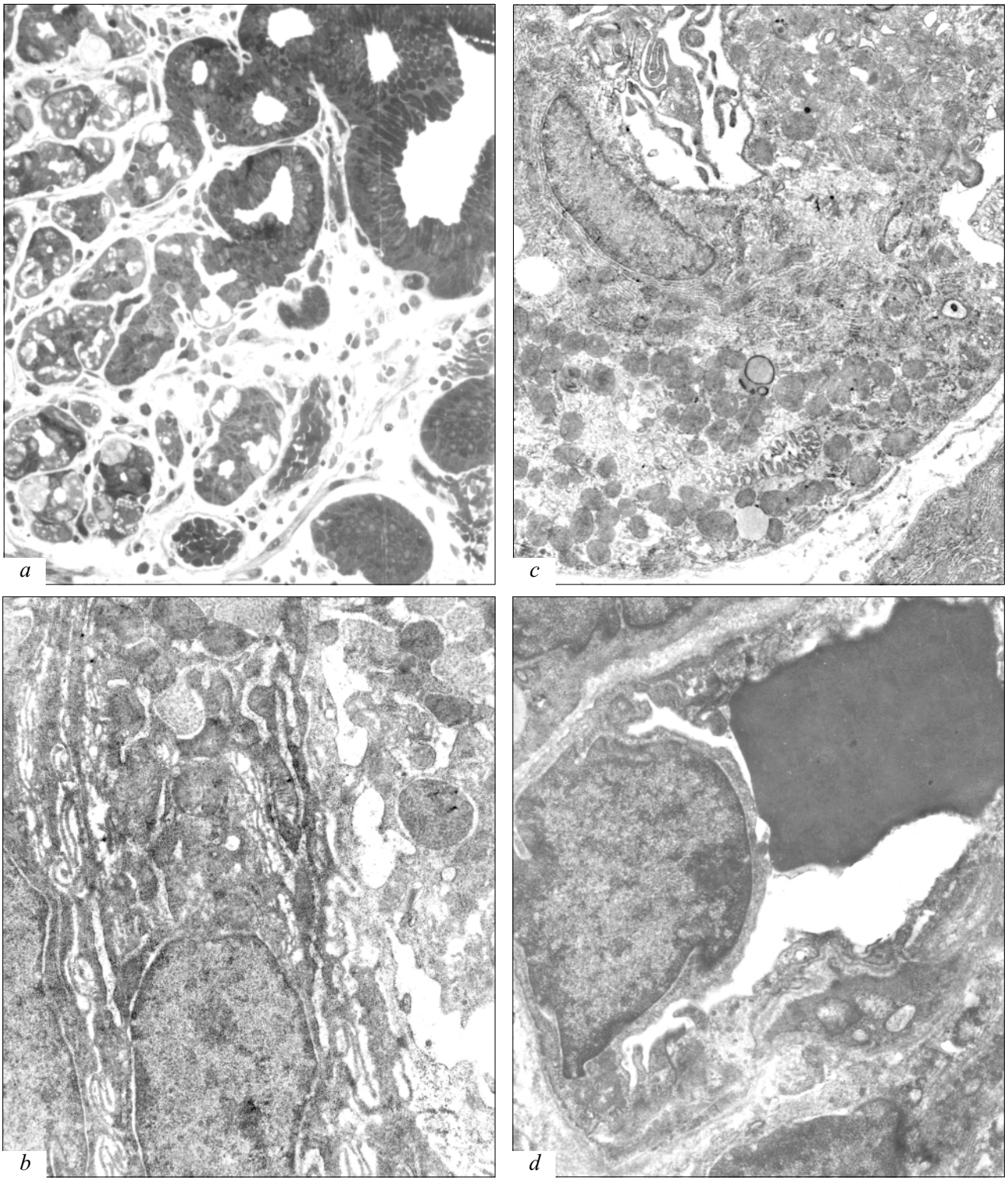

Fig. 1. Gastric mucosa (fundus) in psoriasis associated with chronic opisthorchiasis. *a*) degeneration of glandular epitheliocytes, PAS-positive secretion in epithelial cells, plethoric capillaries. Semithin section, Schiff and azur II staining, ×350; *b*) high electron density of cytoplasmic matrix and secretory granules of surface epitheliocytes, extended cell-to-cell spaces, ×5000; *c*) reduced lumen of a secretory tubule, partial edema of the cytoplasm, accumulation of lipid incorporations and formation of residual corpuscles in a mixed cell in the fundal gland, ×4000; *d*) thickened capillary wall, active endotheliocyte pinocytosis, pericyte proliferation, ×8000.

intensity of fibrosis varied greatly in different specimens, but as a rule predominated in the distal parts of the stomach.

Hence, psoriatic disease associated with opisthorchis invasion involves pathological changes in the gastroduodenal mucosa, mainly degeneration of epi-

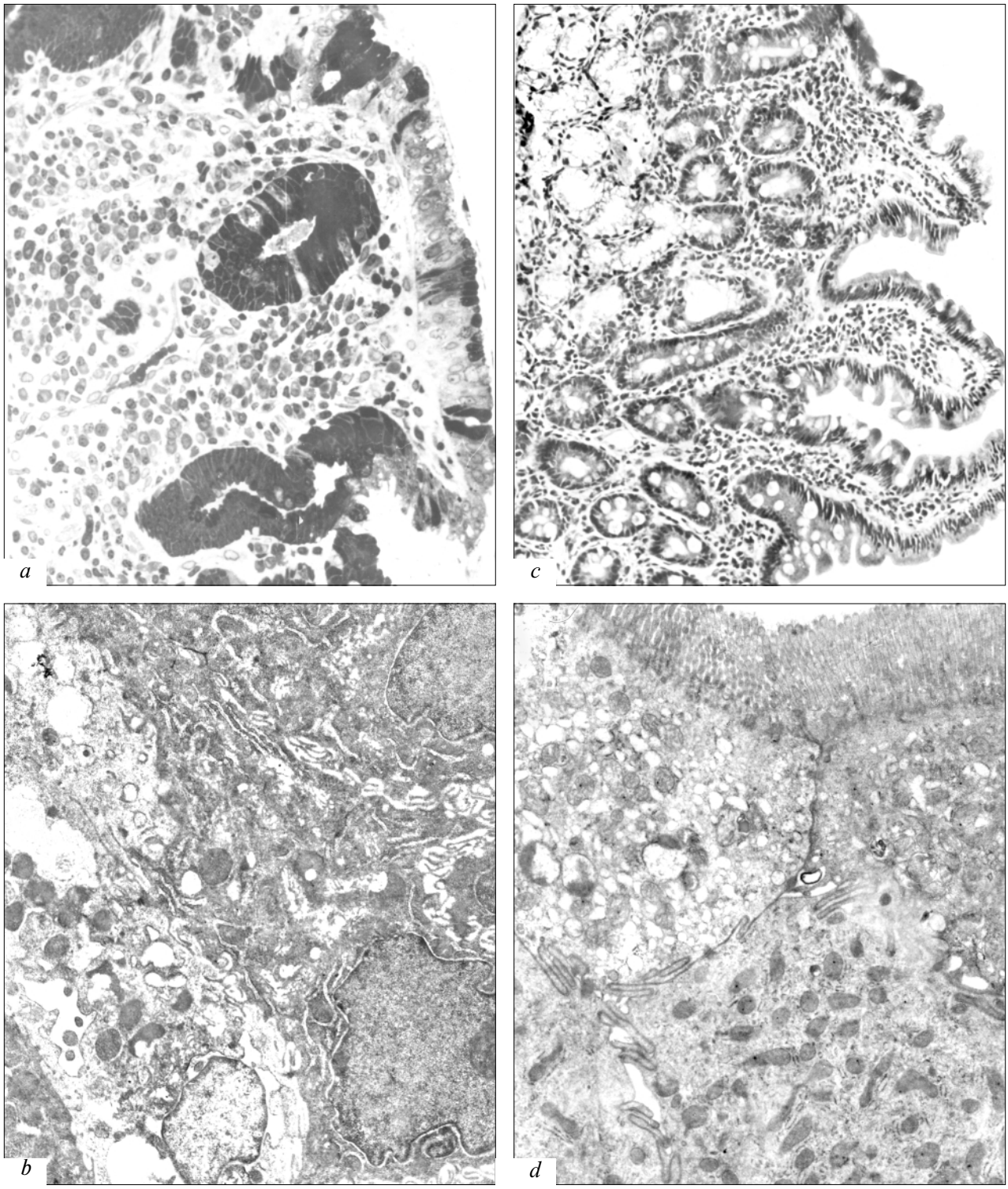

Fig. 2. Gastric pyloric (*a*, *b*) and duodenal (*c*, *d*) mucosa in psoriasis associated with chronic opisthorchiasis. *a*) pronounced degeneration and irregular secretion of the surface epithelium, abundant polymorphic cell infiltration of the stroma. Semithin section, Schiff and azur II staining, ×350; *b*) heterogeneous surface epitheliocytes and their secretory granules, ×4000; *c*) degeneration of duodenal epithelium and Brunner glands, diffuse cellular infiltration of the stroma. Hematoxylin and eosin staining, ×160; *d*) numerous pinocytosis vesicles and small mitochondria, formation of secondary phagosomes in villous enterocytes, ×12,000.

thelial structures with intact typical cell differentiation but with unstable secretory function of the epithelium. The progress of the pathological process leads to glandular atrophy and augments stromal sclerosis, which most pronounced in the pylorus. On the other hand, elements of compensatory adaptive structural rear-

rangement of the mucosa are worthy of note: secretory cell hyperplasia and hyperfunction in parallel with degeneration, atrophy, and hyposecretion of an essential part of glandulocytes, appearance of mixed cells in the fundal glands, capable of polysynthetic secretion, and the presence of numerous actively functioning capillaries.

Structural changes in the gastroduodenal mucosa in combined disease (psoriasis and opisthorchiasis) are to a certain extent similar to those in psoriasis not concomitant with opisthorchiasis [11]. Degeneration and hyposecretion of epithelial cell population predominate in all cases, which can be interpreted as the regeneratory plastic failure syndrome [6]. It is noteworthy that the degenerative component of the dystrophic process in "isolated psoriasis" is more pronounced, *i. e.* this process is more deep and intense. Presumably, changes in the level of expression of genes regulating cell proliferation, differentiation, and death, decrease of production of physiologically active peptides in the cells [9], and individual resistance of certain cells and the organism in general play the leading role here.

The important role of cytogenetic activity of lymphoid cells in the dynamics of degenerative and reparative process is obvious. Comparative morphological analysis of biopsy specimens revealed differences in the reaction of immunocompetent cells in the gastroduodenal mucosa: lymphoid tissue hyperplasia with active lymphodiapedesis and formation of numerous lymphoid follicles in psoriasis and rare lymphoid aggregations in combined disease. It seems that pronounced degenerative component in psoriasis is explained by high level of cytostatic activity of lymphocytes (cytodestruction), cleansing and maintaining the qualitative essence of cells in the organism [1].

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