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Computer and Magnetic Resonance Tomography Possibilities in Diagnosis Recurrent Juvenile Angiofibroma and Detection Possible Reasons of Failure due to Primary Surgical Interventions

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Abstract

The purpose is to assess the value of computed and magnetic resonance tomography in diagnosis of recurrent juvenile angiofibroma, to determine its cause and to make a decision about additional surgical intervention. Above-mentioned imaging methods allow to reveal recurrent juvenile angiofibroma growth in different places of maxilla-facial and skull base regions. These methods allow to determine a tentative cause of failure during primary surgical intervention due to lack of visual control or to significant dimensions of the tumor and its expansions, one of which can be torn off during neoplasm mobilization. The fragment of neoplasm can remain unnoticed during final control examination especially in the conditions of profuse bleeding. One more reason – radiologists mistake in evaluation of angiofibroma spreading. On the basis of computed and magnetic resonance tomography it's become possible to determine localization and dimensions of recurrent juvenile angiofibroma growth and to choose an optimal surgical approach for elimination of the process.

Keywords: juvenile angiofibroma, computed tomography, magnetic resonance tomography, surgical intervention, nasopharynx, auditory tube.

1. Introduction

Surgical treatment of juvenile angiofibroma (JAF) of cranial base is not always characterized by absolute reliability (Dolgushin et al. 2011), (Rzaev, 2005), (Speranskaya, Cheremisin, 2009), (Sennes, 2003). Sometimes recurrence of JAF is observed in different periods after the primary surgery. According to different authors, the recurrence rate is 8 %-63,4 % (Daikches et al. 2005), (Lopatin et al. 2009), (Tang et al. 2009), (Z et al. 2007) in surgically treated patients. We assure that choice of surgical intervention and methodology base of its performing should be support through CT and MRI examinations. Our tactic concerning spreading and choice of surgical approach for JAF was sufficient, but not absolutely reliable. We did a report about it early (Minenkov, Shalabaev, 2011).

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2. Materials and methods

Between 2001-2010 years in otorhinolaryngology-head and neck surgery department National Hospital of Kyrgyz Republic 85 patients were operated with pathomorphological verified JAF. All of them were males between 11 and 31 years old. Among them JAF was removed via natural routes in 7 patients, via endoscopic endonasal approach - in 5 patients, via Denker approach - in 3 patients, via lateral rhinotomy, including extended variants - in 61, via Laurs-Balon approach - in 4 patients and via combined approach (lateral rhinotomy and Laurs-Balon approach) - in 5 cases. At different post-operated time the signs of continued tumor growth developed in 11 patients (13 %). Clinical examination including CT and/or MRI findings, confirm recurrent JAF in all cases. The recurrent JAF was removed in 2 cases after natural routes and in 1 case after endoscopic endonasal approach (primary operations via lateral rhinotomy), in 7 cases after lateral rhinotomy (primary operations via natural routes in 2 cases, via endoscopic endonasal approach - in 2 cases and via lateral rhinotomy in 3 cases) and in 1 case - after Laurs-Balon approach (primary operation was via lateral rhinotomy). We can demonstrate it in the Table.

Patients with recurrent JAF were examined on CT scanners (1-slice Hitachi Pronto, Japan and 16-slice Neusoft, China) with 1-3 mm step in axial view with following reconstructions in coronary projections and on MRI scanner (Philips, Hyrosan-T5-NT, Japan) with 5 mm step in axial, coronal and sagittal views. During analyses CT and MRI examinations we focus our attention on tumor structure, boundaries, form, size and extensions, condition of bone and soft-tissues anatomical structures in consideration of anatomical changes resulting from primary surgical intervention.

Table 1. Comparison of different surgical approaches to JAF and rate of recurrence on the basis of CT, MRI examinations and intraoperational findings

Surgical approach	Number of primary operated patients		Number of recurrences	
	Abs.	%	Abs.	%
Natural routes	7	8	2	18
Endoscopic endonasal	5	6	1	9
Denker	3	3	-	-
Lateral rhinotomy, including extended variants	61	72	7	64
Laurs-Balon	4	5	1	9
Combined (lateral rhinotomy and Laurs-Balon)	5	6	-	-
Total:	85	100	11	100

3. Discussion

The patients complained of difficulty nasal breathing, earache due to secondary obstruction of auditory tube, occasional nasal bleedings and deformation of facial skull. Among them in 2 cases pink, high dense tissue with tuberous spots was noted on nasopharynx.

CT and MRI features for primary and recurrent JAF were very similar. On CT recurrent JAF was defined with non-homogeneous little spotted shadow with density +44,4+55,3 HU. It had the irregular form with slightly deformed hemisphere or ellipse-like contours at widespread tumors. Such formation of contours of a shadow during tumor growth depends on an anatomical constitution of region (a nasal cavity, sphenoid or another paranasal sinuses, pterygoid, pterygopalatine and infratemporal fossa, walls of orbit, optic canal, basocranial regions etc.). Deformation of bone formations from increasing pressure could be seen. That was manifested by their displacing and thinning, slowly increased to the defects. Sometimes it leads to the formation of «sclerosis» periphery rim. The post contrast CT scans reveal an enhancing mass. On MRI the mass of recurrent JAF is manifested by low-to-intermediate signal intensity and multiple areas of signal (flow) void representing the major tumor vessels.

In 8 cases the failure of primary surgical removal of JAF was due to large size and a lot of branches. Prior to the first surgery, the JAF shadow on CT and MRI in these patients corresponded to several anatomic formations. In addition, to nasopharynx and posterior part of the nose, its also overlapped on sphenoid and another sinuses, retromaxillary space and infratemporal fossa. In these cases, in addition to large size tumor extensions there also were smaller ones that after neoplasm preparation could be removed from the main part of JAF and missed during control examination.

In some cases was really hard to decide the place of continuous growth. In one case growing JAF partly (3 cases) or completely (1 case) filled an extensive defect that was formed after ordinary or extended lateral rhynotomy. With such CT results it is impossible to make a decision about the place where part of the tumor had not been removed. However, we could assume that primary surgery defect was located in retromaxillary space where JAF continued growth was not manifested by any symptoms in post-operative period (Fig. 1, 2). It was removed via lateral rhinotomy (3 cases) and via Laurs-Balon approach (1 case).

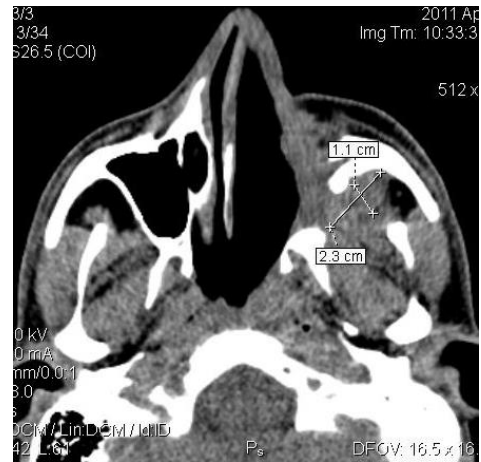
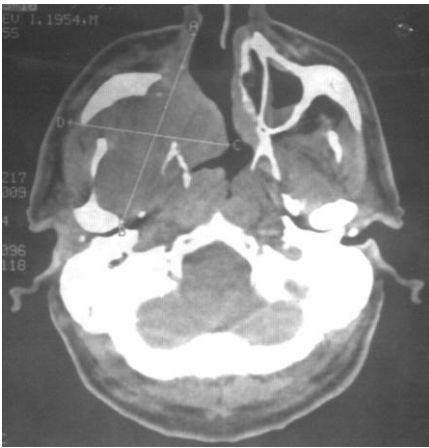


Fig. 1. Axial CT shows recurrent JAF completely filled the right retromaxillary space. **Fig. 2.** Axial CT shows recurrent JAF partly filled the left retromaxillary space.

In another cases removing nasopharyngeal JAF via lateral rhynotomy there were signs of continued growth: unilateral difficulty with nasal breathing developed early, and tumor started to grow in the posterior part of this side of the nose (3 cases). MRI and CT studies performed because of these symptoms revealed tumor growth in the posterior part of the nose and nasopharyngeal posterior and lateral wall with compression of pharyngeal part of auditory tube from one side. Considering primary JAF area (nasal cavity, nasopharynx, main sinus, retromandibular space and growth into middle cranial fossa), a conclusion can be made that remaining part of tumor was located in posterior lateral nasal wall (Fig. 3, 4). They were removed via natural routes in 2 cases and via endoscopic endonasal approach- in 1 case.

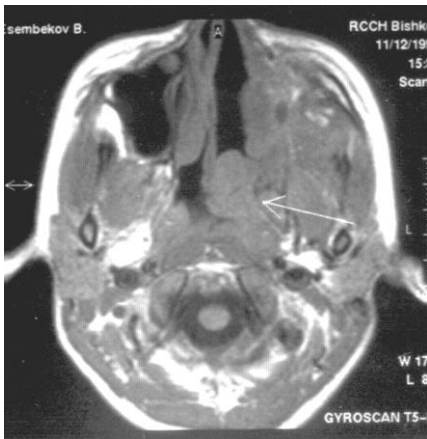


Fig. 3. Axial T1-weighted MRI shows recurrent JAF filled the left side posterior part on the nose.

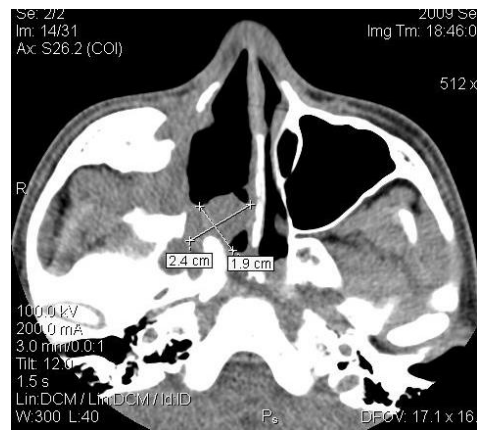


Fig. 4. Axial CT shows recurrent JAF filled the right side posterior part on the nose.

In the 1st case recurrent initial JAF was removed via Laurs-Balon. Five month later on the basis of CT it was found not only in sphenoid sinus, but inside optic canal too. It's very important that this fact was not reflected in protocol of CT and MRI examinations. It was confirmed during surgical intervention. In this case fragment of JAF additionally located in middle cranial fossa (Fig.5). Recurrent JAF was removed via lateral rhinotomy.

CT analysis allowed to conclude that patients with primary surgery performed via natural routes (2 cases) and via endoscopic endonasal approach (1 cases), the continued growth was due to exceeding the opportunities of these accesses. This was evident by the location of the recurrent tumor in pterygopalatine fossa and the primary CT analysis. It clearly showed the shadow of JAF which topically corresponded to the nasopharynx, posterior part of the nose and partly in pterygopalatine fossa. Even though the expansion of the tumor was not extensive, its complete removal without visual control could be difficult. That's why the recurrent tumor was found in pterygopalatine fossa only (2 cases) and in pterygopalatine fossa and posterior part of the nose (1 case), demonstrated on Fig. 6. The recurrent tumor was removed via lateral rhinotomy.

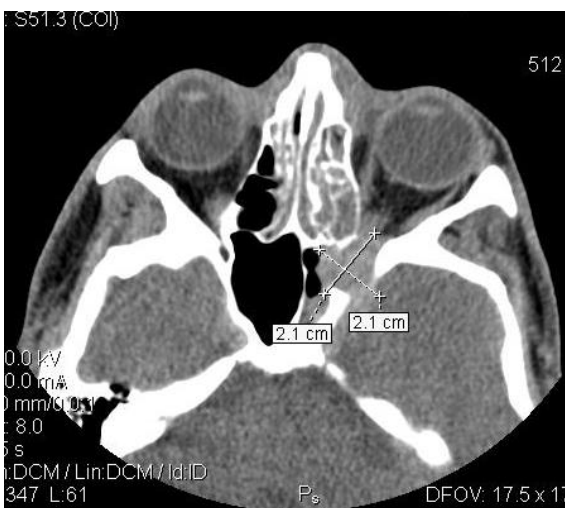


Fig. 5. Axial CT shows recurrent JAF inside optic canal, sphenoid sinus and middle cranial fossa from the left side. Demonstrated shading of both sides ethmoid cells.



Fig. 6. Axial CT shows recurrent JAF in pterygopalatine fossa and posterior part of the left nose.

4. Results

CT and MRI conclusions of recurrent JAF growth were performed in 11 patients in order to decide the surgical approach to tumor removal.

In one case after primary lateral rhinotomy tumor shadow was projected to nasopharynx and pterygopalatine fossa, retromandibular space and subtemporal area. Recurrent tumor was removed after Laurs-Balon approach.

In another 3 cases the tumor shadow occupied nasal cavity and the extensive defect formed due to primary surgical intervention; it was similar to anatomic features founding the first case. Such location of continued JAF growth could not be surgically corrected via natural routes. For this reason, lateral rhinotomy was resorted to as the approach for tumor removal in these cases.

In 3 cases, CT study allowed to reveal that continued tumor growth was restricted by posterior nasal cavity. Such location allowed to conclude that the tumor could be removal via natural routes (2 cases) and via endoscopic endonasal approach (1 case). This decision was made despite the fact that in primary surgery JAF was removed via lateral rhinotomy.

In 1 case recurrent JAF was found inside optic canal, sphenoid sinus and middle cranial fossa. Recurrent JAF was removed via lateral rhinotomy. It's important that in protocols of CT and MRI examinations there were not reflected the fragment of the tumor placed in optic canal.

In 2 cases primary JAF were removed via natural routes and in 1 case via endoscopic endonasal approach and recurrent growth was due to exceeding the opportunities of these accesses. This was evidence by the location of the recurrent tumor only in pterygopalatine fossa or in pterygopalatine fossa and posterior part of the nose. The recurrent tumor was removed via lateral rhinotomy.

This change in operational tactics proved no tumor recurrence in these patients during 5 and more years follow-up.

5. Conclusion

Thus, CT and MRI features for primary and recurrent JAF were very similar. These methods allow to reveal continued JAF growth and permit to determine a tentative cause of failure of the primary surgical intervention. It can be related to exceeding the access opportunities due to lack of visual control or to significant dimensions of the tumor and its expansions, one of which can be torn off during neoplasm mobilization which can remain unnoticed during final control examination often conducted in the conditions of profuse bleeding. Additional reason of primary surgical failure is an absence of correct CT or MRI conclusion with detailed description of all braches and dimensions of JAF. This fact leads to underestimation of real tumor size in pre-operation period. CT and MRI allow to determine real location and dimensions of recurrent JAF growth and to choose an optimal surgical approach. This makes CT and MRI studies absolutely necessary in the presence of clinical signs suggestive of recurrent tumor growth.

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Existing Health Seeking Behaviour in the Eastern Region of Ghana: the Role of Traditional and Orthodox Health Systems

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Abstract

This study examines the role of orthodox and traditional health systems on the health seeking behaviour among people in the Eastern Region of Ghana. Data from a sample of 600 respondents indicate that, the efficacy of both Traditional and Orthodox Health Systems were significant predictors of health seeking behaviour. Thus, respondents' perception and belief in a particular health system influenced their patronage to those health facilities. This calls for the provision of a more balanced and 'culturally congruent' health services that tend to serve the needs of patients. This will go a long way to enhance patients' decision in seeking help from the appropriate health facility on time.

Keywords: health seeking behaviour, traditional health system, orthodox health system, Ghana.

1. Introduction

Conventional medical practice is a system in which medical doctors and other healthcare professionals (such as nurses, pharmacists, and therapists) treat symptoms and diseases using drugs, radiation, or surgery among other techniques (NCCAM, 2011). This practice is variously called; 'allopathic medicine', 'biomedicine', 'mainstream medicine', 'orthodox medicine', and 'Western medicine'. According to World Health Organization [WHO] (2011), "Traditional medicine (TM) refers to health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based medicines, spiritual therapies, manual techniques and exercises, applied singularly or in combination to treat, diagnose and prevent illnesses or maintain well-being."

The WHO (2008) thus considers the traditional healer to be a person who is recognised by the community in which he lives as competent to provide health care by using vegetable, animal and mineral substances and certain other methods based on the social, cultural and religious background, as well as on the knowledge, attributes and beliefs that are prevalent in the community, regarding physical, mental and social well-being and the causation of disease and disability. This domain has taken the new name complementary and alternative medicine (CAM) which encompasses all therapeutic and diagnostic disciplines that exist largely outside the institutions where conventional healthcare is provided (Zollman, & Vickers, 2002). According to

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one estimate, over 80 % of the developing world's population still depends on the complementary and alternative systems of medicine, while about half of the population in industrialized countries use CAM (Bodeke, & Kronenberg, 2002).

The World Health Organisation has consistently estimated that 60–80 % of the population of developing countries rely on traditional health care for their basic health care needs, either on its own or in conjunction with modern medical care. The report further asserts that the rate of increase global market for traditional medicines has been exponential. It has always been an 'invisible mainstream' within the health care delivery system (Penson, Castro, Seiden, Chabner & Lynch, 2001). For many people in developing countries, particularly those living in rural areas, this is the only available, accessible and affordable source of health care. According to the Ministry of Health (MOH) traditional medicine in Ghana is a major source of healthcare for many Ghanaians and it is estimated that about 70-80 % of Ghanaians use traditional medicine as their front line service (MOH, 2005). Ghana has about 45,000 traditional healers and many churches offer spiritual healing, which is a blend of traditional medicine and Christianity (Akosah-Sarpong, 2007). In addition to orthodox medicine, traditional medicine has often been part of the culture of the people that use it, and as a result it is closely linked to their beliefs (Sofowora, 1993).

Quinn (2007), in a study on health care in Ghana stated that health care is provided by both biomedical and traditional healthcare providers. The biomedical healthcare, according to Quinn is those services provided in the hospitals, clinics, health centres and pharmacies. The traditional healers vary enormously from small traditional practitioners in the north of the country to large healing centres in the south of Ghana who provide various services to the people. The results of Quinn's research indicated that the church or mosque was an important source of support, and respondents in all areas spoke of receiving spiritual help from their religious communities. Many people mentioned the role of prayer in helping them cope better with their situation, and religious leaders provided emotional support and spiritual guidance. Methodological considerations of Quinn's study concentrated highly on the role of traditional health care with less emphasis on the orthodox healthcare system, thus skewing the findings more favourably towards the traditional healthcare system.

The main difference between African TM and Western biomedicine is the way in which health and illness are conceptualised. Illness in TM implies a social, spiritual and physical imbalance that requires a natural remedy. Additionally, traditional healers try to explain who or what caused the disease and why this person is affected at that particular time (Bamidele, Adebimpe & Oladele, 2009). It is the supernatural elements of traditional healers that probably underscore the suspicion many proponents and practitioners of biomedicine have towards TM and their reluctance to recognise and work with these practitioners even when they belong to the same cultural belief system (Babbie, 2006).

According to van der Kooi and Theobald (2006) the traditional belief system of the Tswana of Botswana is rooted in African tradition and strongly influences the social significance of cardiovascular diseases. They perceive the need for protection from the orthodox clinics and hospitals for cardiovascular related issues in order to save them from being harmed by evil spirits from traditional healers. The traditional healers explain that the ultimate cause of a CVD related problem may for example be due to a person who is angry with another. The offer of such vague and simplistic explanations to illness conditions by traditional healers provide the impetus for most people to visit them, in addition to the medical care they receive from the hospitals. Conco's (2001) research findings showed that there was a combination of sources of healthcare from the hospitals, clinics, traditional healers and the church and they are all part of the therapeutic arsenal of the Tswana of Botswana. But this practice has been contested by Young (2005) that this may exacerbate adverse effects due to the (unknown) contents of decoctions and mixing of allopathic and traditional medicine, which hampers adequate assessment and intervention when complications occur.

Notwithstanding all the facts about traditional medicine, El Bashir (2008) has shown that there are also diseases that only biomedicine can cure and although doctors fail to cure spiritual ailments, witchcraft and *koqob'al* as well as culture bound diseases, biomedicine is still an essential component of health care among the Zunil of Guatemala. Hence, biomedicine and traditional medicine can only be considered as complimentary and the existence of traditional medicine does not necessarily imply the failure of chemical medicine, and neither does the

existence of chemical medicine suggest the incapacity of natural medicine (MacKian, 2005). Yet a consistent finding in other studies is that, for some illnesses, people will choose traditional healers, village homeopaths, or untrained allopathic doctors above formally trained practitioners or government health facilities (de-Graft Aikins, 2005).

The complementary roles of both orthodox and traditional healing practices and practitioners in health care delivery in Sub Saharan Africa cannot be ignored (Moodley, Sutherland, & Oulanova, 2009). In Ghana, traditional healers have been incorporated as providers into their National Healthcare Delivery System (Pinkoane, Greeff, & Koen, 2008; Pinkoane, Greeff, & Williams, 2005). Traditional and faith healers are often sought after to care for cardiovascular disorders (Abo, Fred-Jaiyesimi, Jaiyesimi, 2008), hypertension or adverse CVD outcomes such as stroke (Hundt, Stuttaford & Ngoma, 2004). Due to cost of biomedical care and medications, traditional and faith healers often offer more accessible and affordable services. Additionally, some healers claim to offer complete "cure" for cardiovascular disorders, which gives the patient the hope of eliminating any future burden related to his or her condition. A study among traditional healers in the northern province of South Africa indicated that traditional and faith healers prescribe cures for patients suffering from cardiovascular disorders and diabetes, as opposed to treatment or management offered in the orthodox healthcare setting. The people believe that cardiovascular disorders and diabetes can be reversed or cured (Sengwana, & Phone, 2004; Peltzer, Khoza, Lekhuleni, Madu, Cherian & Cherian, 2001).

Case, Menendez and Ardington's (2005) findings on health seeking behaviour among people suffering from cardiovascular disorders in South Africa revealed that length of illness prior to death has a significant effect on the probability that medical treatment is sought particularly from traditional healers and non-prescribed treatments—and on the amount spent on all types of medical care. Case et al (2005) in their findings revealed that fully 88 percent of individuals sought care from a public doctor or clinic. Importantly, among adults who had fallen ill, 97 percent had some contact with Western medicine, either through a public clinic or a private doctor. The researchers concluded that services provided by traditional healers appear to be complements to, rather than substitutes for those provided by public and private doctors.

Addo, Smeeth and Leon (2007) observed that most patients who suffer from cardiovascular disorders engage in multiple health seeking behaviours. Such patients who commonly access conventional medical care also use CAM and TM. Other findings (Ruff, Alexander, & McKie, 2005) showed that it is common in developed and developing nations that most CAM usage complements conventional care. Straus (2004) provides evidence from Kenya that patients are likely to use more than one type of provider from the range of those available, such as government facilities, mission clinics, private clinics, pharmacies, and traditional healers. Furthermore, the choice of provider depends on patients' illness, condition, socioeconomic status, and education. If an initial visit to one kind of provider did not resolve the disease satisfactorily, a follow-up visit was made to a different kind of provider. Most traditional healers surveyed in a second study referred patients to Western practices for treatment when necessary (Jain, 2003). The weaknesses of these findings were that certain economic indicators like social factors were not taken into consideration, which have enormous influence on the health seeking behaviour of any group, were not considered. Furthermore, while a plethora of choices exist for people to engage in different health seeking behaviours, the researchers did not take into consideration organismic factors involved in health seeking decision making.

Markowitz, Donovan, DeVane, Taylor, Ruan, Wangand Chavin (2003) have shown that there is remarkably little correlation between the use of traditional medicinal approaches and scientific evidence that they are safe or effective. These researchers believe that herbals and concoctions used by non-orthodox practitioners are highly variable in quality and composition, with many marketed products containing little of the intended ingredients and containing unintended contaminants, such as heavy metals and prescription drugs. For example, traditional drugs like comfrey and kava have been associated with liver failure, aristolochia with genitourinary cancer (De Smet, 2002). More important, herbals contain ingredients that can accelerate or inhibit the metabolism of prescription drugs. The most notorious of these is St. John's wort, which affects the metabolism of nearly 50 percent of all prescription drugs (Markowitz et al., 2003).

Essentially, WHO (2002) asserts that there are problems associated with traditional medicines with respect to clinical data. The quantity and quality of the safety and efficacy data on

traditional medicine are far from sufficient to meet the criteria needed to support its use worldwide. The reasons for the lack of research data are due not only to health care policies, but also to a lack of adequate or accepted research methodology for evaluating traditional medicine. It should also be noted that there are published and unpublished data from research in traditional medicine in various countries, but further research in safety and efficacy should be promoted, and the quality of the research improved. More research is thus required in this direction to fully establish the efficacy of the claims of traditional medical practitioners and the effectiveness of services they provide.

It is noteworthy that each product produced by traditional medicinal practitioners may contain several different plants and potentially hundreds of chemical constituents, some of which may be present in very low concentrations (Chen, 2009; Zhang, 2008; Lu, Chow & Tse, 2007; Zhong, 2007). These factors combine to make laboratory investigation both complicated and expensive. With respect to the concerns raised so far, the purpose of this study was to explore the predicting roles of both Traditional Health System's treatment efficacy and Orthodox Health System's treatment efficacy on respondents' Health Seeking Behaviour.

2. Method

Study design and Area

The study was undertaken in the New Juaben Municipal area. The New Juaben Municipality falls within the Eastern Region of Ghana. The Municipality covers an estimated area of 110 square kilometres constituting 0.57 % of the total land area of the Eastern Region. The Municipality shares boundaries with East-Akim Municipal on the North-East, Akuapem North District on the East and South and Suhum-Krabo-Coaltar District on the West. Koforidua, which is 85 kilometres from the national capital Accra, serves both as the municipal and regional capital.

Population and Participants

The 2012 national housing and population census figures released by the Ghana Statistical Service put it that the municipality has a population of 147,528, with a growth rate of 2.6 %. Females are the dominant group and constitute 51.5 % and males 48.5 % of the population. According to the 2012 Census, people under 15 years constitute 35 % of the population; those between 15-64 years constitute 60 % while those above 65 years constitute 5 % of the population. This signifies that New Juaben Municipality has a fairly young population with a dependency ratio of 64.7 per 100 persons in the 15-64 age groups.

The Municipality is heterogeneous in terms of ethnicity with a high dominance of Akans.

The survey selected a sample of 600 respondents between the ages of 35-75 years old. Majority 53 % of the respondents were females while minority 47 % were males. Data on occupation indicate; 6 % unemployed respondents, 54 % self-employed respondents, 37 % formal-employed respondents, and 3 % student respondents. The ethnic group data on respondents show majority 53 % as Akans. The remaining population comprises of 23 % Ewe tribe, 3 % Guan tribe, 15 % Ga-Adangbe tribe, 2 % Gruma tribe, 3 % Mole-Dagbani tribe and 3 % Grusi tribe. All respondents had some form of religious affiliation, with 81 % Christians forming the dominant group. African Traditional Religion had 11% of the total respondents with the remaining 8 % as Moslems. Description of the localities of the participants include; 52 % Urban, 42 % Semi-urban and 7 % rural dwellers.

Instrument: Orthodox and Traditional Health Systems (OTHS) Questionnaire

The OTHS is a 20-item scale with categories that measure preference involving 1) orthodox health system, 2) traditional health system, 3) spiritual preference and 4) multiple health seeking. This questionnaire also used a 7- point Likert Scale with responses ranging from "Don't Know = 0 to Strongly Agree = 6. The reliability statistics after piloting indicated a Cronbach's Alpha Based on Total Standardized Items is .821. Correlation Between Forms noted a reliability of .659 while Spearman-Brown Coefficient indicated for both Equal Length and Unequal Length values of .795 and .795 respectively. Finally, Guttman Split-Half Coefficient recorded a reliability statistics of .791.

Procedure

Following ethical requirements required for human research, written consents were obtained from all participants before data collection was done. After an initial briefing of the purpose of the study and signing of an informed consent form, all selected participants were given questionnaires to answer, which lasted for an average of one hour and thirty minutes. Participants were allowed to

either answer the questionnaires and hand them over to the researcher or take them home and return them at a later date. For those who answered the questions Breaks were allowed during testing to cater for boredom and tiredness. Completed tests at the end of each session, were scored and packed into sealed envelopes to ensure confidentiality and safety of responses.

Data Analysis

The 20 item Orthodox and Non-Orthodox Medicinal Practices scale was subjected to principal component factor analysis after data screening was completed. Inspection of the correlation matrix revealed the presence of only four coefficients of .3 and above. The Kaiser-Meyer-Olkin measure of sampling adequacy was .709, meeting the commonly recommended value of .6 and above. The Barlett’s Test of Sphericity reached statistical significance, ($\chi^2_{(6)} = 70.739$, $p = .000$). Finally, the communalities were all above .3 further confirming that each item shared some common variance with other items. Given these overall indicators, factor analysis was deemed to be suitable with all 20 items. Principal components analysis was used because the primary purpose was to identify the factors underlying the turnover intention scale. Principal components analysis revealed the presence of one component with eigenvalue exceeding 1, explaining 68.544 % of the variance. All the factors loaded onto one component

3. Results

A significant model emerged [$F_{(2,552)} = 90.319$, $p = .000$] when the hierarchical multiple regression analysis [enter method] was conducted, [see Table 1]. The R^2 was .247, indicating that the model as a whole explained 24.7 % of the variance in Health Seeking Behaviour of respondents. In other words, about 24.7 % of the variance in ‘Health Seeking Behaviour’ can be predicted by Traditional Health System’s treatment efficacy and Orthodox Health System’s treatment efficacy; where Orthodox Health System’s treatment efficacy [$\beta = .383$, $p = .000$] and Traditional Health System’s treatment efficacy [$\beta = .196$, $p = .000$] were significantly and positively related to Health Seeking Behaviour respectively. The results presented in Table 1 above, did show that both Traditional Health System’s treatment efficacy and Orthodox Health System’s treatment efficacy were significant predictors of Health Seeking Behaviour among respondents.

Table 1. Summary of Multiple Regression of Orthodox and Traditional Health Systems

Variables	R-square	Standardised Beta (β)	F
Independent Variables	.247**		90.319**
Efficacy of Orthodox Health System’s treatment scores		.383**	
Efficacy of Traditional Health System’s treatment		.196**	

** $p < .01$

4. Discussion

It is clear that respondents value the efficacy of both Orthodox and Traditional Health Systems’ treatment. Traditional healers, indeed seem to have a compelling presence in the lives of people. Current changes in lifestyle and the increase in the development of the twin problems of cardiovascular and cerebrovascular disorders have pulled traditional healers further into the limelight (Twumasi, 1988; Hillenbrand, 2006). Traditional healers are actively involved in the management of these conditions; patients are increasingly turning to indigenous medication in their attempt to come to terms with the disease. Thus traditional healers have a potentially important role to play in the delivery of health care, particularly in resource poor areas (Labhardt, Schiess, Manga & Langewitz, 2009; Nuwaha, 2006).

These findings contrast with the assertion that, visits to traditional healers and unofficial medical channels should be prevented, thus encouraging people to opt first for the official channels (de-Graft Aikins, 2005; Wootton, 2006). Although the desired health care seeking behaviour is for an individual to respond to an illness episode by seeking first and foremost help from a trained allopathic doctor. The ideal situation is that efforts should be made to raise community awareness

regarding the importance of seeking care from trained personnel and the availability of services. Such efforts will enhance the potential regulation of the practise of herbal medicine.

Implications

This study has broader implications for policy planners and implementers who take decisions that have direct bearing on the health and wellbeing of the people. The importance of why people seek medical care is undoubtedly critical in health policy planning. This study has brought to the fore that health seeking behaviour is not a simple realisation of symptoms and people taking remedial actions of just going to any nearby health centre, hospital or herbalist. It rather involves going through a decision making processes as proposed by the researcher. The implication for policy makers is that there is the need for them to understand that provision of healthcare does not necessarily mean the availability of physical structures and equipment. Healthcare provision should be tailor-made where it would suit the needs of the potential consumers, based on their expectations. The mechanistic ways through which healthcare services and amenities are provided to communities without proper needs assessment should be reconsidered. This study should therefore encourage policy makers and implementers to understand the health needs of the people based on their culturally-mediated understanding of the condition before providing for those needs.

Another implication of this study to policy makers is the need to better integrate traditional and orthodox medicines in order to provide healthcare that would be acceptable to recipients. As postulated by the WHO (2008) over 80 % of Africans, Ghana not being an exception, rely on traditional medicine for healing and cure. This study has confirmed the heavy reliance of the people on traditional medicine. Policy makers are therefore encouraged by findings of this study which supports the notion that there is a heavy reliance on traditional medicine to better integrate both orthodox and traditional medicines as enshrined in the 5-year Plan of the Ghana National Health Policy (2007). By doing this, traditional medical practitioners may be trained to have a better appreciation of the causes of cardiovascular disorders which would help them to better explain the condition to their patients in order to take away the traditional myths surrounding cardiovascular disorders.

Limitations

This study did not explore the merits and demerits of each health system vis-à-vis respondents' health seeking behaviour. Future studies should examine this variable to improve the health care systems in the country.

5. Conclusion

Medical systems, both orthodox and traditional play very significant roles in determining the health seeking behaviour of individuals in the Eastern Region of Ghana. Results from the current study showed that patients' attendance at a particular health facility was mainly based on their assessment of the efficacy of the particular health system. Despite the strong presence of orthodox health system manned by trained personnel and the availability of state-of-the-art equipment, individuals sought traditional medical practitioners who treat all manner of ailments. The roles of both health systems in healthcare delivery are indispensable. There is the need for practitioners, policy makers and researchers to have a proper understanding of how these systems work to enhance public health.

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Conflict of interest statement

The authors declare that they do not have any conflict of interest.

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Efficacy of Intraoperative Lavage with Ozonized Physiological Solution in Case of Experimental Peritonitis

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Abstract

The efficacy of sanitization of the abdominal cavity with ozonized physiological solution under conditions of simulating experimental peritonitis has been examined. By the results of histological examination of the small and large intestinal walls reduced inflammatory process and destruction of the muscular layer in the form of focal moderately pronounced inflammatory infiltration were found. Condition of APUD system was estimated by the amount of APUD (amine precursor uptake and decarboxylation)-cells, found practically in all the glands. An average number of APUD-cells (142+20,4) was close to the control one (326+16,8), which is indicative of an increased functional activity of apudocytes under conditions of introduction of ozonized physiological solution.

Keywords: purulent peritonitis, APUD-system, ozonized physiological solution.

1. Introduction

In spite of the progress and improvement of surgical methods of treatment and introducing of new antibacterial means into surgical practical work, lethal outcome in case of diffuse purulent peritonitis remains high.

One of the most dangerous complications in the post-operative period in case of peritonitis of appendicular genesis is acute commissural intestinal obstruction constituting 4,5 % of all surgical diseases of the abdominal cavity. It is the most severe sign of commissural peritoneal disease and occupies a leading place among other kinds of intestinal obstruction (Upalakalin et al., 2006; Adegbola et al., 2005).

APUD-system (Amine Precursors Uptake and Decarboxylation system) – is the system of cells having general embryonic origin able to produce and accumulate biogenic amines and (or) peptide hormones. Considering the fact that practically half of APUD-cells are located in the gastrointestinal tract, the role of the system in secretory regulation becomes understandable, but its influence in the development intra-abdominal commissures and course of post-operative period is not studied practically (Амирасланов и др., 2010, Курик и др., 2013; Осадчук и др., 1996).

Recently an increased interest to alternative non-medical methods of treatment has been noticed which is connected with a number of factors: a high frequency of allergic reactions to medical agents; a great number of contraindications and side effects in case of administration of potent medical preparations (Штикер, 2000).

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Objective: to study in the experiment histological changes of the intestinal wall and condition of APUD-system in case of peritonitis and efficacy of sanitization of the abdominal cavity with ozonized physiological solution.

2. Materials and methods

The experimental studies were conducted on 30 rats with the body weight of 270 ± 26 mg. Peritonitis was simulated by means of intra-abdominal administration of 10% autofeces mixture. 48 hours later laparotomy was performed, the abdominal cavity was cleaned with antiseptic solutions (group of comparison), washing with ozonized physiological solution (main group). The operative wound was sutured layer-by-layer.

Surgery was performed under conditions of vivarium at the Higher Educational Establishment of Ukraine “Bukovinian State Medical University” according to “General Ethic Principles of Experiments on Animals” (Kyiv, 2011), in accordance with “European Convention on Protection of Vertebrate Animals Used for Experiments and Other Scientific Purposes” (Strasburg, 1985). Blood from the posterior vena cava and the walls of the small and large intestines was taken on the 5th and 10th days after laparotomy had been performed under general i/v anaesthesia (calypso solution 12,5 mg/kg).

Peritonitis was simulated by means of intra-abdominal administration of 10 % autofeces mixture.

1. 48 hours later laparotomy was performed, the abdominal cavity was cleaned with antiseptic solutions (group of comparison), washing with ozonized physiological solution (main group) (Rilling, 1995; Tarverdiyev, 2009). The operative wound was sutured layer-by-layer.

Euthanasia of rats was conducted 10 days after the experiment. Portions of the ileum and caecum were taken for morphological examination.

The fragments of the intestinal wall were fixed in 10 % neutral formalin solution. After common preparation of specimens they were saturated with paraffin. Then microscopic sections 3-5 microns thick were made on the rotation microtome. The sections obtained were stained with hematoxylin-eosin and impregnated with silver by Grimelius and Mason-Gamperl staining.

The number of endocrine cells was calculated in the light microscope Olympus – CX 41 by means of detection of an average amount of APUD-cells in 10 visual fields of every section magnified x 200, x125.

The results were statistically processed by the common methods using Student t-criterion. Differences were considered to be statistically reliable with reliability level 0,05 and higher.

3. Results and discussion

The intestinal wall in the portion of the ileocecal angle in the control group of rats was found to be of usual histological structure. The mucous membrane was in the condition of normal physiological functioning with secreting glands; the glands are with clear enterocytes in the small intestine and colonocytes in the large intestine, as well as a considerable amount of cup-shaped cells secreting mucus (Fig. 1).

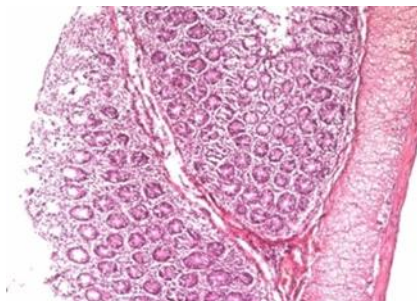


Fig. 1. Portion of the ileocecal angle. Staining with hematoxylin-eosin; magnified: x 125

In the submucous membrane the vessels with moderate blood filling, single lymphocytes, macrophages were found. The muscular membrane was with clear structure of fibers. Nerve plexuses were detected in the muscular layer.

In the control group of rats endocrine cells (APUD-cells), which granules were stained with silver by Grimelius and Mason-Gamperl staining, were found in great amounts in the glands of the mucous membrane. The granules were located in cells both in the basal and apical part of the cells; the granules were of different shape and occupy a considerable part of the cell which is indicative of normal secretory activity of the endocrine cells.

An average amount of APUD-cells in the mucous membrane of the ileocecal angle in the control group of rats was $326 \pm 16,8$ (Fig. 2).

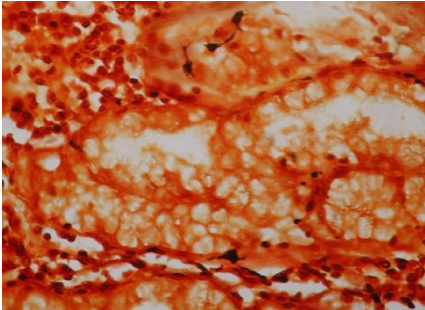


Fig. 2. Mucous membrane in the portion of the ileocecal angle. Impregnated with silver by Grimelius method; magnified: x 200

In the comparison group the portions of Bauhin's valve (ileocecal valve) are found in the sub-mucous layer of the intestinal wall, the walls of the small intestine were inflamed, granulomas were mostly of lymphocytes, macrophages that can be estimated as a sign of chronic inflammatory process; the mucous membrane in this case was with dystrophic changes of the villi epithelium (Ajisaka et al., 2003). In the sub-mucous and muscular membranes of the small and large intestines adjacent to the portion of Bauhin's valve diffuse moderate infiltration with lymphocytes, granulocytes, macrophages, plasmatic cells were found (Fig. 3).

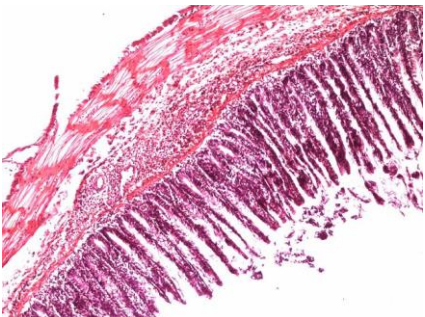


Fig. 3. The portion of Bauhin's valve. Stained with hematoxylin-eosin; magnified: x 200

Moderate infiltration with lymphocytes and macrophages are detected in the intestinal wall in the portion of Bauhin's valve in the sub-mucous layer; hyperemia, stasis in the blood vessels of the sub-mucous membrane. Thickened serous membrane, it focal fibrosis were found as well as its moderate infiltration with lymphocytes and macrophages. In the wall of the large intestine moderate dystrophic changes in the epithelium of the mucous membrane, focal fibrosis of the serous and muscular layers was detected (Fig. 4).

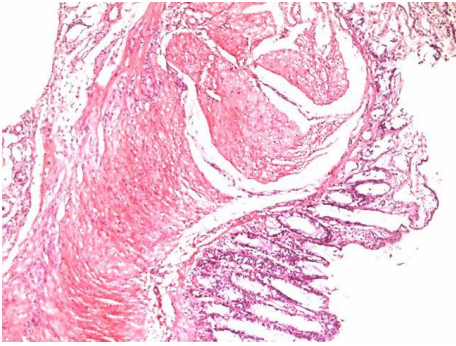


Fig. 4. The portion of Bauhin's valve. Stained with hematoxylin-eosin; magnified: x 125

Inflammatory infiltration was found in the wall with focal superficial ulceration of the mucous membrane. It might be caused by trophic disorders of the intestinal wall at the expense of partial involvement of the mesentery with vessels into commissural process, due to which necrosis, inflammation and ulceration in the mucous membrane occurred, further inflammation expanded to the muscular membrane. In four cases in the group of comparison massive lymphoid-cellular infiltration of the sub-mucous membrane with formation of lymphoid follicles was found which was the reaction of the immune system to pathological process, in this case – on the development of commissures with disorders of the intestinal function (Fig. 5).

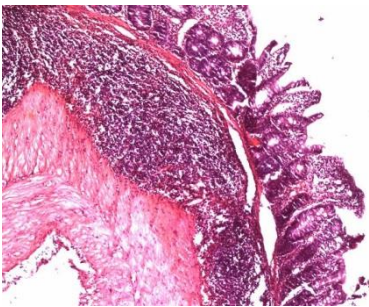


Fig. 5. The portion of Bauhin's valve. Stained with hematoxylin-eosin; magnified: x 125

Examination of APUD-system detected reduced amount of cells, APUD-cells were found only in separate glands, a small amount of argyrophilic and argentaffin granules (Fig. 6) which is indicative of decreased functional activity of APUD-cells. An average amount of APUD-cells in the mucous membrane of the intestine was $96 \pm 18,3$.

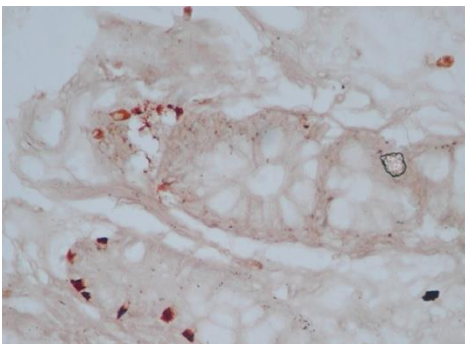


Fig. 6. The mucous membrane of the portion of the ileocecal angle. Impregnation with silver by Mason-Gamperl method, magnified: x 200

In the main group changes in the intestinal wall were less pronounced than in the previous group where ozonized physiological solution NaCl 0,9 % was not used. Thickening of the serous layer in the walls of the small and large intestines of the rats from this group was detected,

although at the same time, changes in the muscular and mucous membranes were not found practically, which was indicative of the fact that these portions of the intestine were not involved in commissural process so much as it was in the group of comparison.

In some cases in the portion of the small intestine hyperchromic glands were available, which is indicative of certain changes of their functional activity, that is, decreased production of mucus at the expense of decreased amount of cup-shaped cells looking light with foamy cytoplasm (Fig. 7).

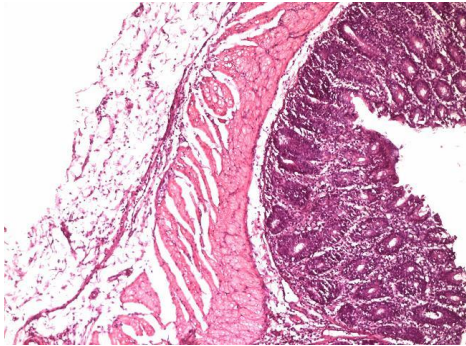


Fig. 7. The portion of the small intestine. Staining with hematoxylin-eosin; magnification: x 200

In some cases dystrophic changes were found in mucous villi. In one case from this group pronounced stasis was found in the lumen of blood vessels on the border of the sub-mucous and muscular membranes which is a sign of certain circulatory disorders. In single cases considerable diffuse lymphoid-cellular infiltration was found in the form of lymphoid follicles of big sizes in the sub-mucous layer of the intestinal wall.

In some cases dystrophic changes in the mucous villi were detected. In one case from this group pronounced stasis was found in the lumen of blood vessels on the border of the sub-mucous and muscular membranes which is a sign of certain circulatory disorders. In single cases considerable diffuse lymphoid-cellular infiltration was found in the form of lymphoid follicles of big sizes in the sub-mucous layer of the intestinal wall (Ando et al., 2006).

Thickened serous membrane with moderate infiltrations with lymphocytes, histocytes was found in the intestinal wall, although the muscular and mucous membranes were not practically changed. In the mucous membrane of the large intestine a focal desquamation of the villi epithelium was detected; the majority of glands was with integral histological structure, in the normal functional condition, with availability of a considerable amount of cup-shaped cells in the glands together with colonocytes (Fig. 8).

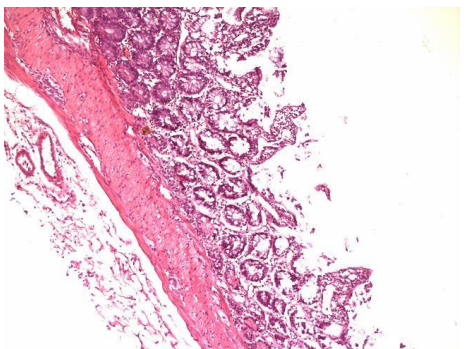


Fig. 8. The portion of the large intestine. Staining with hematoxylin-eosin; magnification: x 200

Moderate fibrosis of the sub-mucous membrane, moderate focal infiltration with lymphocytes and macrophages of the serous membrane was found in the wall of the small intestine. The glands of the mucous membrane were hyperchromic, enterocytes prevailed in them; the number of cup-shaped cells was reduced, although the glands were practically in normal functional condition.

In the portion of the ileocecal angle in some cases the glands were hyperchromic with moderately pronounced dystrophic changes in the epithelium, in some cases dystrophic changes were more focally pronounced. At the same time, focal pronounced lymphocyte infiltration of the mucous and sub-mucous membranes with formation of lymphoid follicles was detected (Fig. 9).

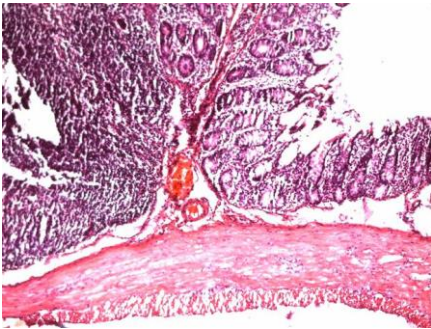


Fig. 9. The portion of the ileocecal angle. Staining with hematoxylin-eosin, magnification: x 125.

In case of staining of the intestinal wall by Grimelius and Mason-Gamperl method a bigger amount of APUD-cells was found in the glands as compared with the group where in simulating commissural disease ozonized physiological solution was not used. The cells were found almost in all the glands (Fig. 10); the number of granules and their sizes were bigger, the granules were located both in the basal and apical parts of cells. An average amount of APUD-cells in this group was $142 \pm 20,4$.

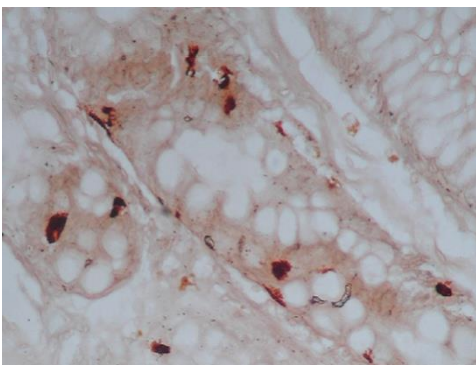


Fig. 10. The mucous membrane of the portion of the ileocecal angle. Impregnation with silver by Mason-Gamperl method, magnification: x 200.

4. Conclusion

1. Histological examination of the walls of the small and large intestines in case of experimental peritonitis resulted in detection of a positive effect with intra-operative administration of ozonized physiological solution NaCl 0,9 % at the expense of decreased inflammatory process, decreased destruction of the muscular membrane in the form of focal moderately pronounced inflammatory infiltration.

2. Examination of APUD-system in case of intra-operative administration of the ozonized physiological solution NaCl 0,9 % found APUD-cells practically in all the glands, the number of granules and their sizes were larger, the granules were located both in the basal and apical parts of cells. The average number of APUD-cells ($142 \pm 20,4$) was close to the control ($326 \pm 16,8$), which is indicative of an increased functional activity of APUD-cells.

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