Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 251 - 258
Received 15 December 2020; Accepted 05 January 2021.

Results of the Study of Indicators of Phosphorus-Calcium Metabolism in Patients with Partial Secondary Adentia

Samarkand State Medical Institute
IlkhomIkromovichKhasanov - assistant of the Department of Dentistry of SamMI, e-mail: mr.ilkhom.khasanov@mail.ru
JasurAlimdzhanovichRizaev - Rector of Samarkand State Medical Institute, Doctor of Medicine, Professor, e-mail: dr.jasur@gmail.com
JakhongirUbaydullaevichAbduvakilov - assistant of the Department of Dentistry of SamMI, e-mail: dr.jahongir@bk.ru
Tashkent State Dental Institute
KakhramonErkinovichShomurodov - Dean of the Faculty of Pediatric Dentistry, Head of the Department of Oral and Maxillofacial Surgery, TGSI, Doctor of Medical Sciences, Associate Professor. e-mail: kahramon_sh @ mail.ru
BarnoZhurakhonovnaPulatova - Associate Professor of the Department of Oral and Maxillofacial Surgery, TGSI, Doctor of Medical Sciences,e-mail: wonderland8540 @ gmail. com.

Annotation. When studying the state of calcium-phosphorus metabolism in connection with the successful implantation of dental implants in patients with partial adentia, the levels of ionized calcium, inorganic phosphate and alkaline phosphatase activity were studied. The study of biochemical parameters in the bone structure of the jaw makes it possible to predict the course of osteointegration processes during the installation of dental implants. Early rejection of intraosseous implants occurs against the background of increased activity of alkaline phosphatase.

Materials and research methods

We performed a clinical and laboratory examination of 72 patients with dental defects who applied for dental treatment at the age of 40 to 65 years. Among the surveyed women there were 45 (62.5%) people, men - 27 (37.5%). The structure of concomitant pathology (Fig.1)included: hypertension - 27 (38%), gastric ulcer - 6 (8%), diabetes mellitus - 5 (7%). The control group included 34 practically healthy people of both sexes.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 251 - 258
Received 15 December 2020; Accepted 05 January 2021.

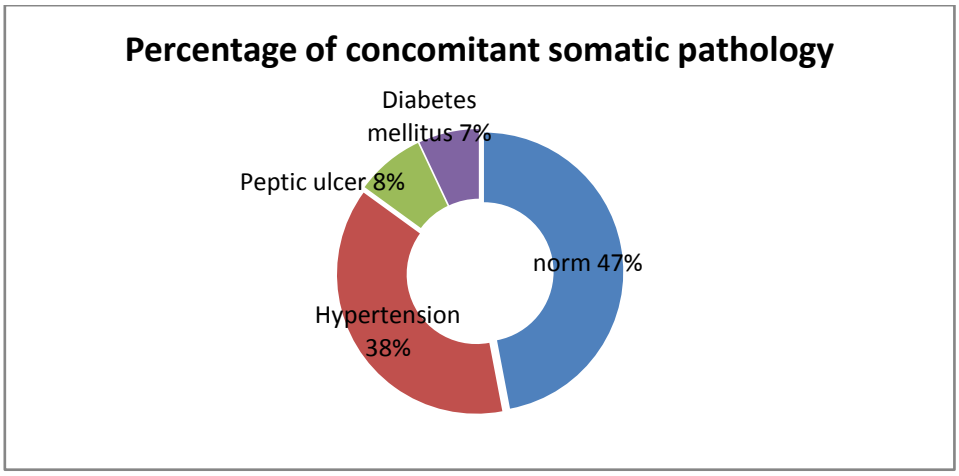

Fig. 1 Structure of the comorbidities of the examined patients.

Serum levels of calcium-regulating hormones were determined in the examined patients: parathyroid hormone (PTH), calcitonin (ctn), calcitriol (ctp). PTH and Ct were determined using the reagents TSH-ELISA(HEMA, Russia) and CALCITONIN-ELISA(HEMA, Russia). Determination of the level of ctp was detected by the ELISA method of the 1,25 Vitamin D ELISA kit (Immundiagnostik, Germany). As markers of bone formation in the blood serum, we studied the level of osteocalcin (OCC) by the ELISA method with the N-MIDO steocalcin kit (Canada).

The concentration of ionized calcium in the sediment was checked using a selective easylyte Calcium analyzer. The regulatory range is 1.12–1.32 mmol / l.

Determination of the concentration of inorganic phosphorus in plasma was performed on a BT 3000 biochemical analyzer (Italy) using Diasys kits (Germany). This method is based on the reaction of inorganic phosphorus with molybdenum to form a complex of hetero folic acid.

The use of surfactants allows free proteins to avoid the filtration stage. The absorption capacity at 340/380 nm is directly proportional to the concentration of inorganic phosphate in the sample. Thenormalrangeis 0.81-1.45 mmol / l.

The activity of alkaline phosphatase (IF) was determined using Olympus kits (Japan) in an AU640 automatic biochemical analyzer (Japan). The method for determining IF activity is based on the recommendations of the International Federation of Clinical Chemistry (IFCC).The activity of alkaline phosphatase was determined at pH 10.4 by measuring the rate of conversion of p-nitrophenyl phosphate to p-nitrophenol in the presence of magnesium and zinc ions, 2-amino-2-methyl-1-propanol as a phosphate acceptor. The rate of change in p-nitrophenol assimilation values was measured chromatically at 410/480 nm and was directly proportional to the IF activity in the sample. The standard range is 30-120 IU / l.

Methods of parametric and nonparametric statistics were used to process the obtained data using the program Statistica 6.0

Results and its discussion.

Results of the study of the level of calcium-regulating hormone.

In this study, the structural and functional state of bone tissue was determined in 72 patients who were scheduled for this type of treatment, and the densitometric parameter density index-(IP,%) was determined.During the study, only 25 (34.7%) patients had normal indicators. The remaining 47 (65.3%) patients were found to have structural and functional bone tissue disorders in the form of osteopenia of

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 251 - 258
Received 15 December 2020; Accepted 05 January 2021.

varying severity in 36 (79.6%) and osteoporosis in 11 (23.4%) people.Analysis of ultrasound densitometry data showed that significantly low IP rates were observed in all age groups, but a large degree of decline and the frequency of detection of osteoporosis were observed at the age of 60-65 years. Osteopenia was found in age group 45-50 years in 7(14.8 percent), aged 50-59 years in 20 (42.5 per cent), aged 60-65 years in 6 (12,7%); osteoporosis aged 42 to 49 years was observed in 4 (36,4%), aged 50-59 years, 6 (54.5%) and aged 60-65 years, 1 (9%) patients.

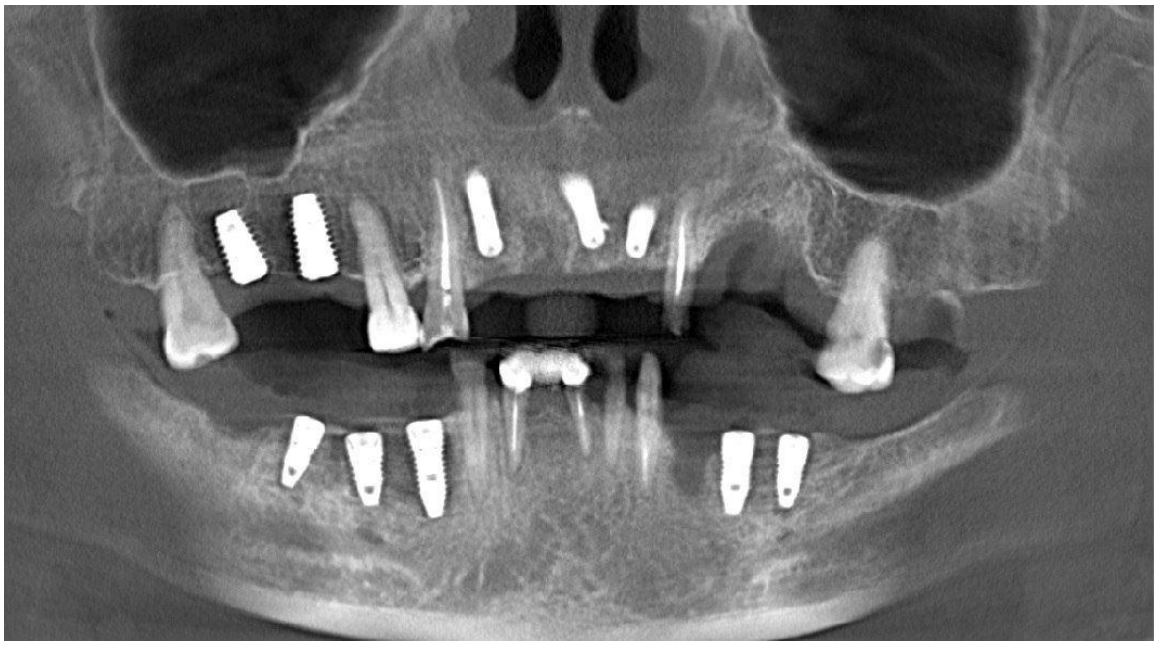

Figure: 1. Cone-beam computed tomography of the upper and lower jaw. Missing teeth in the upper and lower jaw. Atrophy of the alveolar process along the height of the distal upper jaw.

In the mechanism of development of structural and functional disorders of bone tissue, the main role is assigned to the state of hormonal regulation of bone formation and resorption. [12, 13]. The main calcium-regulating hormones are calcitonin, calcitriol and parathyroid hormone, the levels of which were determined in 52 patients who underwent dental implantation(Table 1).Deoxypyridinoline / creatinine is a marker of bone resorption, which enters the vascular bed when osteoclasts destroy bone tissue[10,11].The analysis showed a significant increase in the level of deokipyridinoline in the examined patients - 6.26±0.22 (KG 4.65±0.82; $p<0.01$), which indicated the activation of osteoclasts and the predominance of bone resorption processes. From Table 2, in the group of patients with osteoporosis, the content of deoxydipyridinoline was significantly higher than the KG index-6.99±0.36 ($p<0.001$) and significantly higher than the indicator of the group of patients in whom densitometric examination determined osteopenia - 6.24±0.29 ($p<0.05$).When analyzing the parameters of ultrasound densitometry, taking into account nosological forms and gender, it was revealed that all indicators of the structural and functional state of bone tissue in postmenopausal women, as well as in diabetes mellitus, were significantly low ($p<0.001$).

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 251 - 258
Received 15 December 2020; Accepted 05 January 2021.

Table 1
Levels of calcium-regulating hormones in groups

Calcium-regulatinghormones	Indicators of the control group	Indicators of the group of examined patients
Calcitonin	23,3 ±2,01;p<0,001	3,56±2,01
Calcitriol	60,8±3,86; p <0,001	20,38±2,75
Parathyroidhormone	43,37±2,16; p <0,01	51,33 ± 2,43

The level of calcium-regulating hormones in patients with impaired structural and functional properties of bone tissue

	117,0±4,97;p<0.001	79,11±3,44
Calcium-regulatinghormones	Patientswithosteoporosis	Patientswithosteopenia
Calcitonin	2,17±1,04;p<0,001	3,46±1,08; p < 0,001
Calcitriol	15,23±2,11;p<0,001	21,71±2,76;p<0,05
Parathyroidhormone	53,46±2,17; p <0,01	42,53 ± 3,09; p < 0,001
Osteocalcin	68,19±5,71;p< 0.001	81,94±3,65; p < 0,001
Deoxypyridinoline/ Creatinine	6,99±0,36 p< 0,001	6,24±0,29;p<0,05
Osteocalcin		

The results of the study of the indicators of phosphorus-calcium metabolism.

When studying the state of calcium-phosphorus metabolism in connection with the successful implantation of dental implants in patients with partial adentia, the levels of ionized calcium, inorganic phosphate and alkaline phosphatase activity were studied. The data obtained are presented in Table 3.

Table 3

Indicators of phosphorus-calcium metabolism in patients requiring dental implantation (n=_72__)

Indicator	**Results**	**Laboratorynorm**
Catotal (mmol / l)	2,39±0,11	2,15-2,58
Ca (mmol / l)	1,26±0,05	1,12-1,32
P (mmol / l)	1,09±0,17	0,86-1,45
Alkalinephosphatase (IU/l)	179±44	98-280

The total plasma calcium content in patients requiring dental implantation ranged from 2.08 to 2.61 mmol / l, with an average of 2.39 ± 0.11 mmol/l, and the amount of ionized calcium ranged from 1.18 to 1.33 mmol/L, with an average of 1.26 ± 0.05 mmol/l.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 251 - 258
Received 15 December 2020; Accepted 05 January 2021.

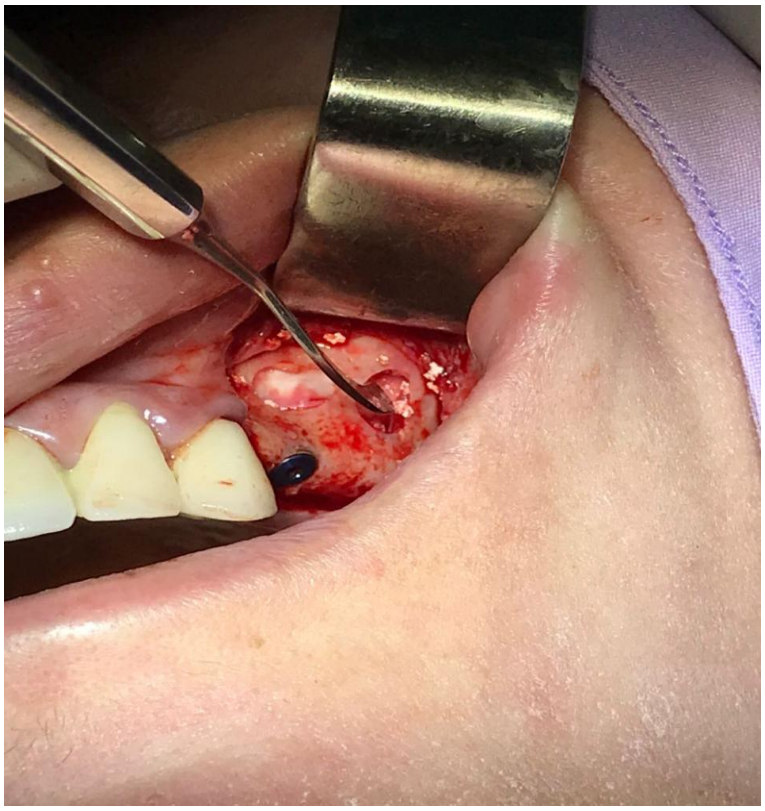

Figure: 2. Examination of the oral cavity. Lack of teeth. View from the occlusal surface. Open sinus lifting was performed with simultaneous installation of implants in the area of 25-27 teeth.

The level of inorganic phosphate in the plasma of patients requiring dental implantation ranged from 0.86 to 1.44 mmol / l, on average 1.09 ± 0.17 mmol / l alkaline phosphatase activity in the range from 121 to 354 U/L, on average 179 ± 44 U/L and exceeded the physiological norm in only 2 patients.The results of comparing the parameters of phosphorus-calcium metabolism in the preoperative period and with the success of implantation of dental implants in patients with partial adentia are presented in Table 4.

Table 4

Characteristics of patient groups depending on the case of rejectionofdentalimplants

Indicator	**Group I (n=47___)**	**Group II (n=25___)**	**P=**
Catotal (mmol / l)	2,36±0,13	2,38±0,11	0,6
Ca (mmol / l)	1,25±0,05	1,28±0,04*	0,001
P (mmol / l)	1,12±0,16	1,07±0,16	0,09
ALKALINE PHOSPHATASE	174±31	183±33	0,9

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 251 - 258
Received 15 December 2020; Accepted 05 January 2021.

Analysis of the parameters of phosphorus-calcium metabolism in different groups showed that the level of total calcium was comparable in both groups, regardless of the success of implantation of DI and ranged from 2.17 to 2.54 mmol/l in patients without rejection of DI and from 2.08 to 2.54 mmol/l in patients with rejection of the dental implant ($p < 0.01$) below the indicators obtained in the second group, where the level of Ca2 + ranged from 1.19 to 1.33 mmol/l.In individuals with successful implantation of DI, the content of inorganic phosphorus in blood plasma in the range from 0.85 to 1.33 mmol/l. In the second group, fluctuations in the phosphate level were in the same range from 0.9 to 1.33 mmol/l. There was no statistically significant difference between the groups in the level of inorganic phosphate.

Determination of the activity of alkaline phosphatase in the groups of subjects showed that in patients of the first group it was from 121 to 247 IU/l. In the second group, the activity of the enzyme was slightly higher and ranged from 140 to 354 U/l. At the same time, the average values of ALP from statistically significant ones did not differ between the groups.

Thus, in the group of patients with unsuccessful implantation of dental implants, higher levels of free ionized calcium were determined at comparable levels of total calcium, inorganic phosphate, at the same time, it should be noted that the activity of alkaline phosphatase in the group of patients with an unfavorable outcome of dental implantation was not statistically significant differences, in patients with rejection of dental implants was higher.

A correlation analysis was performed to establish the relationship between the frequency of rejection of DI and the indicators of mineral metabolism. The results are presented in table 5.

Table 5

Results of correlation analysis of the amount of integration of CI and indicators of mineral metabolism.

Theanalyzedindicators	**Correlationcoefficient g (Spearmen)**	**P=**
ІЩФ	0,5	0,002
Ca^{2+}	0,4	0,003

Thus, a positive linear correlation was found between the level of alkaline phosphatase activity (r=0.5) and the content of ionized calcium in blood plasma (r =0.4) and the number of failed dental implants.
There were no statistically significant correlations between other indicators and cases of early rejection of dental implants.

Conclusions

Based on the correlation analysis, it was proved that unsuccessful integration of dental implants was observed in patients with an increased content of ionized calcium and an increase in the activity of alkaline phosphatase in blood plasma.

References

1. Baidik, O.D., Shilov, M.V., Dolgun, D.A., Logvinov S.V. Ultrastructural changes in the mucous membrane of the maxillary sinus in patients with odontogenic sinusitis // Bulletin of Siberian Medicine: scientific and practical journal. - 2009. - Volume 8, N 2. - S. 10-16.
2. Biryulev A.A. Modern aspects of prevention, diagnosis and complex treatment of chronic odontogenic perforated maxillary sinusitis in the early period of the disease: author. dis. ... Candidate of Medical Sciences: 14.01.14., 03.02.03 - M., 2012 .-- 25 p.
3. GatalskayaI.Yu. Treatment and prevention of traumatic sinusitis with zygomatic-maxillary fractures in conditions of concomitant injury: author. dis. ... Cand. honey. sciences. 14.01.14 - M., - 2010 - 24 p.
4. Daminov R.O. Treatment of patients with pathology of the nasal cavity and paranasal sinuses before sinus lifting and dental implantation: dis. ... Cand. honey. sciences. 01/14/14 - M. - 2011, - 156 p.
5. Klenkina E.I. Differential and diagnostic aspects of latent odontogenic and chronic rhinogenic maxillary sinusitis: dis. ... Cand. honey. sciences. 01/14/14 - St. Petersburg. - 2011 .-- 107s.
6. Kulakov A.A., Sheludchenko T.P., Daminov P.O., Kozlov B.C. Endosurgical preparation of patients with paranasal sinus pathology before sinus lifting // Proceedings of the 19th and 20th All-Russian Scientific and Practical Conference. - M. - 2008 .-- S. 156 - 157.
7. Садыгов Р.В. Особенности синуслифтинга после ранее проведенного хирургического вмешательства на верхнечелюстной пазухе:автореф. дис. … канд. мед. наук. – М., 2012.- 23 с.
8. Alper A., Nukhet C., Burcu B. Acute Maxillary Sinusitis Associated with Internal Sinus Lifting: Report of a Case // European Journal of Dentistry. – 2008. - Vol.2. - P. 69-72.
9. Anavi Y., Allon D.M., Avishai G., Calderon S. Complications of maxillary sinus augmentations in a selective series of patients // Oral Surg Oral Med Oral PatholOral RadiolEndod. – 2008. - №106(1). – P. 34-42.
10. Barone A., Santini S., Sbordone L., Crespi R., Covani U. A clinical study of the outcomes and complications associated with maxillary sinus augmentation // Int JOral Maxillofac Implants. – 2006. - № 21(1). – P. 81-86.
11. Khasanov I .I.,RizaevJ.Al. Shomurodov K. E.,PulatovaB.Zh.//SPECIFIC FEATURES OF DENTAL IMPLANTATION IN PATIENTS WITH MAXILLAR SINUSITIS
12. Yarmukhamedov B.N., Amanullayev R.A., Pulatova B.J. Assessment of possible risk of Dental implantation according to morphological criteria in patients with a somatic backround pathology // American journal of research No. 7-8,2020.
13. ShukhratZiyadullaev, JasurRizaevAlimdjanovich, Irina AgababyanRubenovna, JamshidIsmailovAbduraimovich, SoatboyYuldashevJiyanboyevichThe effect of budesonide on the quality of life in patients with bronchial asthma. European Journal of Molecular & Clinical Medicine Volume 7, Issue 2, 2020 1760-1766
14. RizaevJ.A., AshirovZ.F., ToshevS.U., SalamovaL.A., BaratovaM.R.Medical and organizational measures to improve the provision of medical care in the dermatovenerology profileInternational Journal of Current Research and Review 2020 12(24), c. 120-122
15. Bazarova D. Some problems of counteracting crimes related to laundering of illegal proceeds in Uzbekistan Journal of Advanced Research in Dynamical and Control Systems. Volume 11, Issue 7, 2019, Pages 873-885
16. Ismailova, Z., Choriev, R., Ibragimova, G., Abdurakhmanova, S., &Abdiev, N. (2020). Competent model of Practice-oriented education of students of the construction profile. Journal of Critical Reviews. Innovare Academics Sciences Pvt. Ltd. https://doi.org/10.31838/jcr.07.04.85
17. Ismailova, Z., Choriev, R., Musurmanova, A., &Aripjanova, M. (2020). Methods of training of teachers of university on advanced training courses. Journal of Critical Reviews. Innovare Academics Sciences Pvt. Ltd. https://doi.org/10.31838/jcr.07.05.85
18. Ismailova, Z., Choriev, R., Salomova, R., &Jumanazarova, Z. (2020). Use of economic and geographical methods of agricultural development. Journal of Critical Reviews. Innovare Academics Sciences Pvt. Ltd. https://doi.org/10.31838/jcr.07.05.84
19. Isakov, A., Tukhtamishev, B., &Choriev, R. (2020). Method for calculating and evaluating the total energy capacity of cotton fiber. IOP Conference Series: Earth and Environmental Science, 614(1), 012006
20. Davirov, A., Tursunov, O., Kodirov, D., Baratov, D., &Tursunov, A. (2020). Criteria for the existence of established modes of power systems. IOP Conference Series: Earth and Environmental Science, 2020, 614(1), 012039

21. Obidov, B., Choriev, R., Vokhidov, O., &Rajabov, M. (2020). Experimental studies of horizontal flow effects in the presence of cavitation on erosion-free dampers. IOP Conference Series: Materials Science and Engineering, 883(1), 012051
22. Khasanov, B., Choriev, R., Vatin, N., &Mirzaev, T. (2020). The extraction of the water-air phase through a single filtration hole. IOP Conference Series: Materials Science and Engineering, 2020, 883(1), 012206
23. Shokhrud F. FayzievThe problem of social stigma during a pandemic caused by COVID-19International Journal of Advanced Science and Technology Vol. 29, No. 7, (2020), pp. 660-664 http://sersc.org/journals/index.php/IJAST/article/view/13965/7188
24. FayziyevShokhrudFarmonovich Medical law and features of legal relations arising in the provision of medical services. International journal of pharmaceutical research Volume 11, Issue 3, July - Sept, 2019 P. 1197-1200 doi:10.31838/ijpr/2019.11.03.088http://www.ijpronline.com/ViewArticleDetail.aspx?ID=11016
25. Bryanskaya Elena, FayzievShokhrud, Altunina Anna, Matiukha Alena Topical Issues of an Expert Report in the Process of Proving in a Criminal Examination. International Journal of Engineering and Advanced Technology (IJEAT)ISSN: 2249 – 8958, Volume-9 Issue-1, October 2019 5345-5349 DOI: 10.35940/ijeat.A2946.109119 https://www.ijeat.org/wp-content/uploads/papers/v9i1/A2946109119.pdf
26. FayzievShokhrud (2019) Legal Aspects of Transplantology in the Republic of Uzbekistan. Systematic Reviews in Pharmacy, ISSN: 0976-2779, Vol: 10, Issue: 2, Page: 44-47 doi:10.5530/srp.2019.2.08 http://www.sysrevpharm.org//fulltext/196-1575419211.pdf?1586863081
27. Tulaganova, G.Some issues of observance of international legal norms of fight against legalization of criminal incomes in the Republic of UzbekistanJournal of Advanced Research in Dynamical and Control Systems12(2 Special Issue), c. 143-155