C-5

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Artikel Ilmiah	:	Relationship between body mass index, handgrip, and cognitive status on frailty status in elderly women
Penulis Artikel Ilmiah	:	Dwi Ngestiningsih, **Hermina Sukmaningtyas**, Timothy G Susanto, Enny Probosari
Jumlah Penulis	:	4 Orang
Status Pengusul	:	Penulis anggota
Identitas Jurnal Ilmiah	:	a. Nama Jurnal : Bali Medical Journal (Bali Med J) 2020
		b. Nomor ISSN : P-ISSN.2089-1180, E-ISSN: 2302-2914
		c. Volume/nomor/bulan/tahun : Volume 9, Number 3: 859-862
		d. Penerbit : Universitas Udayana, Bali
		e. DOI artikel (Jika ada) : https://doi.org/10.15562/bmj.v9i3.2147
		f. Alamat web Jurnal : https://balimedicaljournal.org/index.php/bmj/article/view/2147/pdf
		g. Terindeks di : SCOPUS Q4, SJR 0.11
		h. Link Turnitin : https://doc-pak.undip.ac.id/18107/15/TURNITIN-Relationship-between-BMI.pdf

Kategori Publikasi Jurnal Ilmiah (beri ✓ pada kategori yang tepat) :

- [√] Jurnal Ilmiah Internasional / Internasional Bereputasi
- [ ] Jurnal Ilmiah Nasional Terakreditasi
- [ ] Jurnal Ilmiah Nasional tidak Terakreditasi / Nasional terindeks di DOAJ, CABI, COPERNICUS

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Karya Ilmiah (isikan di kolom yang sesuai)			Nilai Akhir Yang Diperoleh
	Internasional Bereputasi **(40)**	Internasional	Nasional Terakreditasi	
a. Kelengkapan dan Kesesuaian unsur isi artikel (10%)	4			3
b. Ruang lingkup dan kedalaman pembahasan (30%)	12			9
c Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	12			10
d. Kelengkapan unsur dan kualitas penerbit (30%)	12			10
Nilai Total = (100%)	**40**			**32,00**
Nilai pengusul = 16			**(40% x 32)/3 =**	**4,27**

KOMENTAR/ULASAN PEER REVIEW

Kelengkapan dan Kesesuaian Unsur	:	Kelengkapan unsur artikel baik
Ruang Lingkup dan Kedalaman Pembahasan	:	Ruang lingkup keilmuan sesuai dengan bidang keilmuan pengusul
Kecukupan & Kemutakhiran Data & Metodologi	:	Kecukupan dan kemutakhiran metodologi sesuai
Kelengkapan Unsur dan Kualitas Penerbit	:	Bali Medical Journal merupakn journal internasional terindex Scopus Q4

Semarang, 16 Mei 2023
Penilai

Dra. Ani Margawati, M.Kes., Ph.D.
NIP 196505251993032001
Unit kerja : Fakultas Kedokteran
Bidang Ilr : Kedokteran
Jabatan : Lektor Kepala / Pembina Tk. I

Bali Medical Journal

INDONESIAN PHYSICIAN FORUM &
INDONESIA COLLEGE OF SURGEONS,
INDONESIA

Editorial Board for Regional Europa

Editorial Board for Regional Asia

Editorial Board Members

Editorial inquiries to be addressed to:
email 1: editorbalimedicaljournal@gmail.com
email 2: editor@balimedicaljournal.org

Vol. 9 No. 3 (2020): (Available online: 1 December 2020)

ORIGINAL ARTICLE

A network meta-analysis on comparative efficacy and tolerability of on-demand therapy for premature ejaculation

Niwanda Yogiswara, Yusuf Azmi, Yufi Aulia Azmi

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Risk scoring in predicting preterm birth of women receiving cervical cerclage

Chro Najmaddin Fattah

Online First: Dec 1, 2020 |

Abstract | PDF

Quickert procedure for involutional lower eyelid entropion: a multi-centre study

Rodiah Rahmawaty Lubis, Novie Diana Sari, Herna Hutasoit

Online First: Sep 27, 2020 |

Abstract | PDF

The functional and physical state of the anal sphincter complex in the patients with rectal prolapse in the post-surgery period

Solmaz Soltan Imanova

Online First: Oct 21, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Scoring predictor for successful of arteriovenous fistulas as vascular access in hemodialysis patients: PAVAS score

Maulidya Ayudika Dandanah, Budiono Budiono, Ito Puruhito

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

The effect of purple sweet potato (Ipomea batatas L) ethanol extract on Estrogen Receptor Alpha (ERÎ±) and SOD mRNA expression in the menopause-liver animal model

I Wayan Sugiritama, Ida Ayu Ika Wahyuniari, I Gusti Ayu Dewi Ratnayanti, Ni Made Linawati, I Gusti Nyoman Sri Wiryawan, Ni Luh Gede Yoni Komalasari, I Gusti Kamasan Nyoman Arijana

Online First: Oct 13, 2020 |

ORIGINAL ARTICLE

The effect of Balinese Purple Sweet Potato (Ipomoea batatas L.) tuber ethanolic extract on renal Nox4 level in mice with a high purine diet

Agung Nova Mahendra, Ni Wayan Sucindra Dewi

Online First: Oct 13, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

The in-vivo anti-inflammatory effect of red earthworm (Lumbricus rubellus) ethanolic extract from organic farmland in Bali, Indonesia

Ni Wayan Sucindra Dewi, Agung Nova Mahendra

Online First: Oct 13, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

The hepatoprotective effect of cacao beans whole extracts (Theobroma cacao L.) in oxidative stress mice

Ida Ayu Dewi Wiryanthini, I Wayan Gede Sutadarma, Ni Wayan Sucindra Dewi, I Wayan Surudarma

Online First: Oct 13, 2020 |

ORIGINAL ARTICLE

Correlation of plasma vitamin d receptors with the severity of psoriasis vulgaris

Made Swastika Adiguna, Luh Made Mas Rusyati, Prima Sanjiwani Saraswati Sudarsa

Online First: Oct 20, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

High serum interleukin-2 levels are associated with pruritus in chronic kidney disease undergoing regular hemodialysis

Luh Made Mas Rusyati, Yenny Kandarin, Ni Nyoman Tri Priliawati

Online First: Oct 20, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Correlation between malondialdehyde levels and disease activity in vitiligo

Prima Sanjiwani Saraswati Sudarsa, I Gusti Ayu Agung Praharsini, Ratih Vibriyanti Karna

Online First: Oct 20, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Overexpression of nuclear factor kappa B (NF-Ð°B) protein as a risk factor for anthracyclin chemoresistance in luminal a subtype locally advanced breast cancer (LABC) at Sanglah General Hospital, Bali - Indonesia

Prabudi Prabudi, Ida Bagus Tjakra Wibawa Manuaba, I Wayan Sudarsa

Online First: Oct 23, 2020 |

ORIGINAL ARTICLE

High c-reactive protein level as risk factors of complications in upper gastrointestinal bleeding

I Ketut Mariadi, Karismayusa Sudjana, I Dewa Nyoman Wibawa

Online First: Oct 30, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Patient characteristics of non-operative anterior cruciate ligament injury associated with poor knee functions on activities of daily living: a cross-sectional study

I Putu Gde Surya Adhitya, Ida Bagus Amertha Putra Manuaba, Lalu Suprawesta, Yosika Septi Mauludina, Siti Ainun Marufa

Online First: Nov 3, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

In vitro study comparison of purple leaf extract as denture cleanser at different concentration towards S. mutans growth on flexible denture

Tri Purnami Dewi

Online First: Nov 5, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

The effect of ethyl acetate fraction of Moringa oleifera leaves on neutrophil and MDA levels in the improvement of liver dysfunction in male rats with sepsis model

Riswanto Riswanto, Tatar Sumandjar, Dhani Redhono, Robby Kurniawan, Arief Rahman

Online First: Dec 1, 2020 |

ORIGINAL ARTICLE

Investigating the relationship between accountability and job satisfaction: A case study in hospitals affiliated to Yazd University of Medical Sciences 2017

Askari Roohollah, Hatami Hanza Maryam

Online First: Dec 1, 2020 |

ORIGINAL ARTICLE

Effect of heparin administration on heparin-induced thrombocytopenia (HIT) in atherosclerotic New Zealand Rabbit (Oryctolagus cuniculus)

Victor Jesron Nababan, Agung Prasmono, Endang Retnowati, Djoko Legowo, Sofna Banjarnahor

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Growth parameters in children with atopic dermatitis in Erbil City, Kurdistan Region-Iraq

Ahang Mohammed Hamid, Dindar Sharif Qurtas

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Correlation between postherpetic neuralgia (PHN) patientsâ€™ stress level and the quality of life of their families in Universitas Sumatera Utara Hospital

Finisia Angkasa, Imam Budi Putra, Ariyati Yosi

Online First: Nov 7, 2020 |

ORIGINAL ARTICLE

Bacterial identification of acne vulgaris

Lovena Sari, Nelva Karmila Jusuf, Imam Budi Putra

Online First: Nov 7, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

The quality of life in the treatment of maxillofacial fractures using open reduction: A prospective study

Nyoman Ayu Anggayanti, Endang Sjamsudin, Tantry Maulina, Aulia Iskandarsyah

Online First: Nov 17, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Correlation between body mass index with striae in female adolescent

Imam Budi Putra, Nelva K. Jusuf, Chyntia Giska Aryunisari

Online First: Nov 19, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Prevalence of and risk factors associated with anal HPV infection among men who have sex with men in Bali, Indonesia

I Ketut Agus Somia, Tuti Parwati Merati, Dewi Dian Sukmawati, I Gusti Ayu Agung Elis Indira, Ida Bagus Nyoman Putra Dwija, Made Yogi Oktavian Prasetia, Nittaya Phanuphak, Siriporn Nonenoy

Online First: Nov 23, 2020 |

ORIGINAL ARTICLE

Clinical presentation and outcome of COVID-19 infection in Type 2 Diabetes Mellitus: a preliminary data from a tertiary hospital in Jakarta during the early days of the pandemic

Ida Ayu Kshanti, Giri Aji, Marina Epriliawati, Md Ikhsan Mokoagow, Jerry Nasarudin, Nadya Magfira, Anggraini Permata Sari, Annela Manurung, Aryan Yohanes Djojo, Elizabeth Yasmine Wardoyo, Martha Iskandar, Nikko Darnindro, Radhiyatam Mardiyah

ORIGINAL ARTICLE

High expression of early secretory antigenic target 6 mRNA as a potential predictor of tuberculous lymphadenitis

Rita Cempaka, Titik Nuryastuti, Vincent Laiman, Fara Silvia Yuliani, Ahmad Musthafa, Hadis Pratiwi, Marcellus Marcellus, Didik Setyo Heriyanto

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Lipid and cardiac profile assessment following the co-administration of Cisplatin and methanolic extract of Portulaca oleracea in adult Wistar rats: an experimental study

Izuchukwu Azuka Okafor, Uchenna Somtochukwu Nnamah, Jude Nnaka

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Correlation between stress level and family support towards fasting and postprandial glucose level in type 2 diabetes mellitus

Ni Wayan Trisnadewi, I Made Sudarma Adiputra, Ni Putu Wiwik Oktaviani, Putu Aris Suapriyanti, Ni Luh Gede Intan Saraswati

Online First: Dec 1, 2020 |

ORIGINAL ARTICLE

IDH1 mutation in Balinese glioma patients and its relationship with clinicopatological parameters

Ni Putu Sriwidyani, Ida Ayu Ika Wahyuniari, Herman Saputra, I Gusti Kamasan Nyoman Arijana

Online First: Dec 1, 2020 |

ORIGINAL ARTICLE

The analysis of hand maximum voluntary contraction and its associated factors among hemodialysis-dependent chronic kidney disease patient in Jordan

Hesham A. Almomani, Thaker Almomani, Marya Almomani, Soha kanaâ€™an, Ahmed Al-Khawaldeh

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Correlation between perceived stigma and quality of life of Leprosy patients

Duma Wenty Irene Sinambela, Syahril Rahmat Lubis, Dina Arwina Dalimunthe

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Relationship of proteinuria severity with Xerosis Cutis in children with Nephrotic Syndrome at the Haji Adam Malik Hospital

Ami Utamiati, Sri Wahyuni Purnama, Irma D Roesyanto

Online First: Dec 1, 2020 |

ORIGINAL ARTICLE

Factors influence bullous keratopathy post cataract surgery at National Eye Center of Cicendo Eye Hospital (PMN RSMC), West Java, Indonesia

Siska Siska, Feti Karfiati Memed, Ine Renata Musa

Online First: Nov 1, 2020 |

ORIGINAL ARTICLE

Blood pressure and glomerular filtration rate in obese adolescents

Gusti Ayu Putu Sri Satya Mahayani, I Made Arimbawa, Ida Bagus Subanada, I Wayan Dharma Artana, I Nyoman Budi Hartawan, I Ketut Suarta

Online First: Dec 1, 2021 |

Abstract | PDF

ORIGINAL ARTICLE

Effect of oral L-Arginine supplementation on intima hyperplasia after Fogarty balloon embolectomy catheterization in New Zealand Rabbit (Oryctolagus cuniculus)

Syahroni Ibnu, Bambang Sektiari Lukiswanto, Djoko Legowo, Budiono Kasirin, Ito Puruhito

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Seizure free status as a good predictor for quality of life of temporal lobe epilepsy patients after amygdalohippocampectomy

Muhamad Thohar Arifin, Ashari Ashari, Surya Pratama Brilliantika, Jacob Bunyamin, Hardian Hardian, Happy Kurnia Brotoarianto, Alifiati Fitrikasari, Zainal Muttaqin

Online First: Dec 1, 2020 |

ORIGINAL ARTICLE

Relationship between body mass index, handgrip, and cognitive status on frailty status in elderly women

Dwi Ngestiningsih, Hermina Sukmaningtyas, Timothy G Susanto, Enny Probosari

Online First: Dec 1, 2020 |

ORIGINAL ARTICLE

Differences of maternal leukocyte count in premature rupture of membranes and preterm premature rupture of membranes

Besari Adi Pramono, Putri Sekar Wiyati, Julian Dewantiningrum

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Breastfeeding Peer Counselor Program in Malaysia: Impact on Breastfeeding Duration and Exclusivity

Ezura Madiana Md Monoto, Zuhra Hamzah, Nor Kamariah Mohamad Alwi, Asrul Abdul Wahab

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

The correlation between serum fibroblast growth factor-23 with urinary fractional excretion of phosphate in predialysis chronic kidney disease

Yenny Kandarini, Vika Wirdhani, Anak Agung Wira Dewi Lestari

Online First: Dec 1, 2020 |

ORIGINAL ARTICLE

Development of KET-U-T phenomenon to assess comprehensive care, support, and treatment in people living with HIV

Ketut Suryana

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

The potential of sunscreen preparation containing ethanol extract of Moringa oliefera leaves in nanoemulgel formulation

Agung Wiwiek Indrayani, I Gusti Ayu Artini, Ida Ayu Alit Widhiarthini, Ni Wayan Tianing, I Made Jawi

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Antiplasmodial activity of chalcone derivatives compound through phagocytosis of kupffer cells in experimental malaria hosts

Lilik Wijayanti, Paramasari Dirgahayu, Yulia Sari, Danus Hermawan, Ida Nurwati

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

The effect of duration of wound skin tissue on MDA, TNF-Î±, IL-6, Caspase 3, VEGF levels, and granulation tissue thickness in the white rat (Rattus novergicus)

Amru Sungkar, Danar Widyatmoko, Kristanto Yuli Yarso, Brian Wasita

Online First: Dec 1, 2020 |

ORIGINAL ARTICLE

The effect of Myrmecodia pendans extract toward gastric histology in white rats treated with toxic dose of gentamicin: a preliminary report

I Made Bagus Januar Bahari Putra, Ketut Budiasa, I Made Merdana, Anak Agung Ayu Mirah Adi

Online First: Dec 26, 2020 |

ORIGINAL ARTICLE

Hip fracture among elderly people: a single cohort study from Kurdistan of Iraq

Asso Amin, Hersh Haider Hama Ali, Saman Anwar Faraji, Sara Noori Ghafoor, Saman Hama Shareef, Saman Sadeq, Soran Noori, Khalid Anwar Hama Ghareeb, Mohammed Ibrahim Mohialdeen Gubari

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

The effectiveness of yoga exercise toward blood pressure and endothelial-derived hyperpolarizing factor (EDHF) level in hypertensive diabetic population

Nila Wahyuni, Agung Wiwiek Indrayani, Indira Vidiari Juhanna

Online First: Dec 1, 2020 |

Abstract | PDF

ORIGINAL ARTICLE

Assessment of lipid profile among patients with seborrheic dermatitis

Barez Burhan Abdulrahman, Ali Muzan Dhahir Elethawi, Hadi Mohammed Abdullah

Online First: Dec 1, 2020 |

REVIEW

The problem of prevention and correction of posture disorders with the help of orderly muscle activity: a literature review

Raspopova E.A., Shmeleva Svetlana Vasilyevna, Irina Vitalevna Mikhaylova, Rysakova O.G.

Online First: Dec 1, 2020 |

REVIEW

The potential role of exosome on cytokine storm and treatment of severe COVID-19 infection

Hamsu Kadriyan, Eka Sunarwidhi Prasedya, Nova Audrey L Pieter, Masyita Gaffar, Abdul Qadar Punagi, Agussalim Bukhari

Online First: Sep 26, 2020 |

Abstract | PDF

REVIEW

Virtual patient simulation method for learning and assessment in cardiology field

Ida Bagus Amertha Putra Manuaba, Ni Gusti Ayu Putu Lestari Santika Dewi, I Putu Yuda Prabawa, Agha Bhargah, Sri Darmayani, Chien-Chih Wu

Online First: Oct 17, 2020 |

Abstract | PDF

REVIEW

Potential development of turmeric extract nanoparticles as a topical anti-inflammatory agent

Nyoman Suryawati, I Made Jawi

Online First: Oct 21, 2020 |

Abstract | PDF

REVIEW

Role of PRP (platelet-rich plasma) in alopecia areata: A literature review

Ni Wayan Eka Ciptasari

Online First: Nov 26, 2020 |

Abstract | PDF

REVIEW

Hypertensive emergency: an overview of heart as target organ damage

Starry Homenta Rampengan, H J Sunarto

Online First: Dec 1, 2020 |

Abstract | PDF

REVIEW

Exercise and cardiomyocyte regeneration

Indira Vidiari Juhanna, I Nyoman Adiputra, I Putu Gede Adiatmika, I Made Muliarta, Ni Made Linawati, I Putu Adiartha Griadhi

Online First: Dec 1, 2020 |

Abstract | PDF

CASE REPORT

Uterine cervix mixed adenoneuroendocrine carcinoma: case report of a rare, high grade and aggressive tumor

I Gusti Ayu Sri Mahendra Dewi

Online First: Dec 1, 2020 |

Abstract | PDF

CASE REPORT

Pregnancy with seropositive toxoplasmosis: a case report

Natassa Zefanya Darsana, Anak Agung Ngurah Jaya Kusuma

Online First: Dec 1, 2020 |

Abstract | PDF

CASE REPORT

Coronavirus disease 2019 (COVID-19): A case report in a patient with diabetic ketoacidosis and hypertension

Mauritus Lambertus Edy Parwanto, Reza Aditya Digambiro, Dwi Utomo Nusantara, Twindy Rarasati

Online First: Sep 26, 2020 |

Abstract | PDF

CASE REPORT

Spontaneous conversion to sinus rhythm in atrial fibrillation after dual antiplatelet and anticoagulant therapy in patients with unstable angina

Agha Bhargah, I Gusti Agung Bagus Krisna Jayantika, I Putu Yuda Prabawa, Ida Bagus Putra Manuaba

Online First: Oct 17, 2020 |

Abstract | PDF

CASE REPORT

Delayed reconstruction of soft tissue defects in mangled lower extremities: A report of three cases

Agus Roy Rusly Hariantana Hamid, I Gusti Putu Hendra Sanjaya, I Made Suka Adnyana, I Gusti Ayu Putri Purwanthi, Grace Inriani Ronge, Gede Wara Samsarga

Online First: Oct 27, 2020 |

CASE REPORT

Management of von willebrand disease in pregnancy in resource-limited settings: a case report

I Wayan Losen Adnyana

Online First: Oct 30, 2020 |

CASE REPORT

Unilateral pedicle screw fixation as a less invasive surgical procedure: a case series and literature review

Tjokorda Gde Bagus Mahadewa

Online First: Oct 30, 2020 |

Abstract | PDF

CASE REPORT

Myasthenic crisis in pregnancy: a case report

I Nyoman Hariyasa Sanjaya, Anton Supono, I Made Oka Adnyana, Ryan Saktika Mulyana, Evert Solomon Pangkahila, I Made Ariyana

Online First: Nov 17, 2020 |

Abstract | PDF

CASE REPORT

Ruptured ectopic pregnancy management in the COVID-19 pandemic era: a case report

I Gde Sastra Winata, Anton Supono

Online First: Nov 18, 2020 |

Abstract | PDF

CASE REPORT

Ventral meatotomy as management of female urethral stricture: a case report

Anak Agung Gde Oka

Online First: Dec 2, 2020 |

Abstract | PDF

CASE REPORT

Tracheostomy in upper airway obstruction on a COVID-19 patient

Rohaizam Japar Jaafar, Zakinah Yahaya, Mohd Razif Mohamad Yunus, Marina Mat Baki

Online First: Dec 1, 2020 |

Abstract | PDF

CASE REPORT

Recombinant tissue plasminogen activator (rTPA) in young adult patient with acute ischemic stroke: a case report

Dodik Tugasworo, Aditya Kurnianto, Retnaningsih Retnaningsih, Yovita Andhitara, Rahmi Ardhini, Runy Dyaksani, Jethro Budiman

Online First: Dec 1, 2020 |

Abstract | PDF

CASE REPORT

Sinister Snoring in A Child

Boon Chin Te, Zhi Xiang Yeoh, Rohaizam Japar Jaafar, Bee See Goh

Online First: Dec 1, 2020 |

Abstract | PDF

CASE REPORT

Dengue hemorrhagic fever with severe ocular complication: case series

Anak Agung Mas Putrawati Triningrat, I Ketut Agus Somia, I Made Dwi Lingga Utama, NI Putu Ngurah Sri Yuliastini, Made Paramita Wijayati, Ariesanti Tri Handayani

Online First: Dec 1, 2020 |

CASE REPORT

Mutilating surgery with free flap in oral and oropharyngeal cancer: A report of case series

Mohammad Nasyatmuddin Yahya, Ahmad Kusyairi Khalid, Mohd Razif Mohamad Yunus, Arman Zaharil Mat Saad

Online First: Dec 1, 2020 |

Abstract | PDF

EDITORIAL

P2B2 PABI XVII Semarang 2020 Continuing Professional Development in Surgery: Increasing the Competence of General Surgeons to Improve The Health Services

Benedictus Kartika Widjajanto

Online First: Oct 28, 2020 |

Abstract | PDF

EDITORIAL

The 4th International Conference on Translational Medicine and Health Sciences

Muhamad Thohar Arifin

Online First: Nov 12, 2020 |

Abstract | PDF

EDITORIAL

Strategy within limitations during COVID-19 pandemic in Indonesia: Shortage of PPE, prevention, and neurosurgery practice

Christopher Lauren, Angel Iskandar, Donny Argie, Elric Brahm Malelak, Samuel Edhi Surata Sebayang, Reza Mawardy, Vito Masagus Junaidy, Yohanes Firmansyah

Online First: Dec 1, 2020 |

ORIGINAL ARTICLE

Bali Medical Journal (*Bali Med J*) 2020, Volume 9, Number 3: 605-612
P-ISSN.2089-1180, E-ISSN.2302-2914

Published by DiscoverSys

Risk scoring in predicting preterm birth of women receiving cervical cerclage

Chro Najmaddin Fattah*

ABSTRACT

Background: Cervical incompetence is primarily a clinical diagnosis, which is characterized by recurrent painless dilation of cervix and spontaneous second trimester loss and preterm delivery. Despite recent advances, the indications and efficacy of cervical cerclage have been remained controversial. This study was performed with the aim of evaluating the risk factors of preterm birth among women who underwent cervical cerclage and establishing a scoring system to predict preterm labor in this group of women.

Material and Methods: This retrospective cohort study was performed on 95 women who had undergone cervical cerclage from January 2016 to January 2018 in Maternity Teaching Hospital of Sulaimaniyah, Iraq. A total of 66 women who delivered after 34 weeks were used as control group, compared to 29 cases who delivered before 34 weeks.

Results: According to the findings of the present study, there was a significant association between the preterm birth before the 34 weeks of pregnancy and the risk factors of pathological vaginal discharge, cervical length less than 25 mm prior to cerclage placement, and passive smoking. The positive predictive value was calculated using the prediction model was%99 with a risk score of 3, 47.6% with risk score 2 and 28.2% with risk score 1.

Conclusion: The prediction model can be used as a tool to identify patients at a higher risk for PTD <34 weeks and to recognize those that could benefit from cerclage and deliver after 34 weeks. It could also be a useful tool for identifying those high risk women with cerclage who require increased surveillance.

Keywords: cervical cerclage, cervical length, preterm delivery, risk score

Cite This Article: Fattah, C.N. 2020. Risk scoring in predicting preterm birth of women receiving cervical cerclage. *Bali Medical Journal* 9(3): 605-612. DOI:10.15562/bmj.v9i3.1821

Consultant Obstetricain/ Gynaecologyist, Sulaimani Maternity teaching Hospital

Assistant professor, Head of Department Obstetrics/ Gynaecology, College of Medicine, Unveristy of Sulaimani, Sulaimani, Kurdistan Region- Iraq

*Correspondence to:
Chro Najmaddin Fattah, Consultant obstetrician/gynaecologyist. Head of Department Obstetrics/Gynaecology, College of Medicine, Unveristy of Sulaimani, Sulaimani, Kurdistan Region- Iraq.
chrofattah@yahoo.co.uk

Received: 2020-05-12
Accepted: 2020-09-21
Published: 2020-12-01

INTRODUCTION

Childbirth before the week of 37th of gestation is defined as preterm birth (PTB).[1] However, the definition may vary between countries depending on viability perceptions. The World Health Organization (WHO) places 22 weeks of gestational age or 380 gram birthweight as the lowest limit, at least for the purpose of perinatal statistics.[1] Recent WHO data indicate that every year 15 million infants are born prematurely, it is about one in 10 births worldwide.[1] There are several primary risk factors: PTB-related maternal demographic specific i.e. single marital status, very high or very low maternal ages and low socio economic situation.[2,3] Black women are at higher risk of PTB about three times compared to white women. Also, the risk of very early PTB is three to four times more among them.[2] Body-mass-index (BMI) and nutritional situation are two effective factors in PTB. The risks of PTB[2,3] and low birth-weight neonates[4] are higher in underweight women. Moreover, smoking leads to increased risk of preterm delivery,[7] premature rupture of the membranes,[5] and placenta previa.[6] Having a previous history of PTB or pregnancy loss at the second trimester are the main risk factors in PTB,[2,3] so that the risk of relapse varies between 15% to over 38%.[2] This risk increases with the number of previous cases and is conversely correlated with pregnancy age of previous PTB.[8] However, women with a prior PTB history are only accounted for 10-15% of preterm delivery cases. Both spontaneous and iatrogenic PTBs are associated with increased risk of recurrence.[10]

The major cause of PTB is genital tract infection. A pathologic study consisting of over 6180 placentas provided early evidence regarding the role of intrauterine infection in preterm birth.[10] Chorioamnionitis, described as neutrophil infiltration of the fetal membranes, was present in about 5% of all placenta, but the aborted cases between the weeks of 21 and 24 were happened in 80% of the placentas of infants. The results showed a direct association between decreased gestational age and increased incidence of histologic chorioamnionitis. Only 13.8% of women experience fever during labor and most infections treated subclinically.[10]

The characteristics of current pregnancy include the risk of PTB increased by 2-folds in the case of a short inter-pregnancy interval < 6 months, which is explained by lower opportunity for inflammation recovery and compensating food deficiency due to the previous pregnancy. Women who experience preterm delivery in their first childbirth are at a

higher risk.[11] Multiple gestations are associated with a considerable risk of preterm labor, so that 15 to 20% of all PTBs are attributed to 2-3% multiple birth.[3] Due to uterine over-distention, about 48% of multiple gestations leads to preterm delivery. Vaginal bleeding due to placenta previa, placental abruption or bleeding in the first two trimesters increases the risk of PTB.[11] The entrance of bacteria living in lower genital tract into decidua can cause leukocytosis and cytokine production which cause synthesis of prostaglandin in the chorion, myometrium, amnion, and decidua.[12] This can result in uterine contractions, membrane exposure, cervical dilatation, and thereby the entrance of more microbes into uterine cavity. There are evidence regarding the association of bacterial vaginosis (BV) with the higher risk of preterm birth, especially BV before the sixteenth week of pregnancy,[13] which indicates a critical period for preterm delivery later in gestation.[14] The association of untreated pyelonephritis and urinary tract infection with preterm delivery has long been recognized. Other studies have also shown the effect of pyelonephritis or asymptomatic bacteriuria on the preterm birth. All pregnant women are recommended to perform screening and treatment for bacteriuria at their first prenatal visit.[15] A more detailed risk evaluation of PTB is possible through investigating secondary risk factors based on signs, symptoms and examination during the gestation. One of the important topics in practical obstetric care is screening for primary symptoms of spontaneous preterm delivery.[16]

Ultrasound measurement of the cervical length

Transvaginal sonography (TV) is regarded as the most efficient method for assessing cervix.[17] TV provides a better reproducibility of the entire cervix, thus it is more accurate compared to transabdominal ultrasound and digital examination.[18] Abdominal ultrasound suffers from several technical problems, including bladder distension, cervix position, and myometrium contractions, which provides a fallacious cervical appearance.[17] The measurement of cervical length using transvaginal sonography is among the main predictors of PTB in all under-studied cases.[9]

Fetal Fibronectin

Fetal fibronectin (fFN) is a large glycoprotein that produced by fatal cells. It is located in the interface between the maternal decidua and fetal membranes. High concentrations of fFN could normally be found within the extracellular matrix of this layer.[17] Cervicovaginal discharge in the early stages of gestation as well as just before delivery contain fetal fibronectin.[18,19] However, its concentration is normally low within the 2nd and early 3rd trimester. It seems that there is an association between the beginning of preterm labor and disconnection of choriodecidual junction, which results in fetal fibronectin release that is detectable in cervicovaginal mucous. Fetal fibronectin can be quantitated. According to an initial clinical study by Lockwood et al., both the presence and absence of fetal fibronectin have strong predictive value in predicting the risk of preterm delivery.[18] There are supportive data about the screening for fetal fibronectin in pregnancy in women with PTB, since colytics and transmit to tertiary care should be considered.[20]

problem statement(Risk scoring):Although many individual tests have failed to be predictive of PTB on their own, there have been attempts to combine risk measures into various risk models.[21] To date, no combination of tests has proven useful to consistently screen women for potential PTB risk. Methodologically, the ideal study design for postulating and testing predictive methods for preterm birth is prospective cohort studies. Although case-control studies aimed to investigate new biomarkers may represent the frequency of a marker in pregnancy that leads to PTB, they are unable to provide an exact estimation of the negative and positive effectiveness of a given test.[22]

Cervical Cerclage

In 1742, Herman[23] used Emmet trachelorrhaphy to treat three patients and introduced cervical surgery to prevent repeated gestation loss. The use of transvaginal cerclage in cervical incompetence treatment has been documented by Shirodkar in 1803 and later by McDonald in 1805.[10] In spite of little adjustments, these methods have been used in the management of incompetent cervix.[2]

Cervical Incompetence

There is no consistent definition of cervical incompetence, but it can be specified as shortening and dilatation of the cervix before the week of 24 of delivery when no preterm labor is presented. Cervical incompetence is mostly associated with pain-free, progressive dilation of the uterine cervix in the 2nd or early 3rd trimester of pregnancy which may lead to membrane premature rupture, membrane prolapse, preterm birth, or mid-trimester pregnancy loss.[25] It is estimated that cervical incompetence happens at less than 1% of obstetric cases[26] and approximately in 8% of females who have experienced recurrent mid-trimester losses.[27] In women having preterm delivery, the length of cervix remains relatively constant till the third trimester of pregnancy.[28] Any possible

Published by DiscoverSys | *Bali Med J* 2020; 9(3): 605-612 | doi: 10.15562/bmj.v9i3.1821

reduction in the length of cervix (less than 0.5 mm per week) is not clinically significant.[28] Heath et al.[29] reported an average cervical length of 38 mm at 23rd week. Moreover, Iams et al.[30] documented a mean cervical length of 35 mm at 24th week and 34 mm at 28th week. If funneling is present, measurement should exclude the funnel and be taken from the funnel tip to the external os.[31] In women who deliver preterm or require cerclage, the rate of change in cervical length may be predictive of preterm birth. Although women with preterm delivery experience faster reduction in cervical length than those with normal delivery time, the difference is usually small.[32] The reduction in cervical length ranges from 0.5 mm per week to 8 mm per week.[32]

Aim of the study

The aim of this study is to evaluate the risk factors associated with preterm birth in women before receiving cervical cerclage and to develop a scoring system for predicting preterm labor in these women. This prediction model can be used as a tool to identify women who are likely to develop preterm birth and thus can be offered frequent surveillance.

PATIENT AND METHODS

Type of the study

This is a retrospective cohort study of 95 patients who received cervical cerclage between 12 to 24 weeks in 2 years' time.

This study was conducted from January 2016 to December 2018 at Sulaimaniyah maternity teaching hospital, Iraq.

Inclusion Criteria

Singleton pregnancies between 12 to 24 weeks which undergone cervical cerclage in 2016 & 2017 in Sulaimaniyah maternity teaching hospital.

Exclusion Criteria

Multiple pregnancy: Cerclage before 12 weeks or after 24 weeks of gestation: Multiple and higher order pregnancy: Pregnancy complicated by medical disease.

Sample Size Measurement

In the present study, 6 risk factors related to preterm delivery (<week 34 of delivery) were studied, including the length of cervix prior to placement of cerclage, the age of gestation at time of cervical placement of cerclage, urgency cerclage placement, exposing to passive smoking, history of recurring pathological vaginal secretions, and history of 3 or more losses including mid-trimester miscarriage and preterm birth.

Data Gathering

The data were obtained from the case sheet of the patient and phone calls.

Statistical Analysis

Data entry was performed using an excel spreadsheet and the statistical analysis was performed by SPSS program, version 21 (IBM SPSS statistics package software program for statistical analysis). The data were presented in tabular form to describe the variables of the study. The patients were divided into two groups based on the delivery time (before and after 34 weeks). Independent t-test were used to compare the mean values of quantitative variable. Chi-square tests were used to compare categorical data between the two mentioned groups of the patients. Logistic regression was performed to find Odds ratio of the factors found to be risky for preterm birth. P values of 0.05 were used as a cut off point for significance of statistical tests.

RESULTS

The study was performed in tertiary teaching hospital. Totally, 95 women with required criteria were included in the study, of which 66 cases had delivery at or over 34 weeks and 29 cases had delivery lower than 34 weeks of pregnancy. The total number of live birth (LB) and neonatal death (ND) in both term and preterm infants in Sulaimaniyah maternity teaching hospital, Iraq during 2016 and 2017 has been shown in Table 1.

In 2016, the total number of live birth were 18441, neonatal mortality rate was 1.2%, In relation to gestational age (21.97%) of them were full term and (78.03%) were preterm. Among preterm deaths, 18.9% were born ≥34 weeks, while 81.03% were born before 34 weeks. In 2017, total number of live birth was 19994, neonatal mortality rate was 1.37% in which 18.25% of them were full term and 81.75% were preterm. Among preterm deaths, 17.86% were born ≥34 weeks, while 82.14% were born before 34 weeks.

Table 2 shows the demographic characteristic of the studied groups. In this study, the patients were of comparable age; the mean age of patients who gave birth before 34 weeks was 32.1 ± 5.0 and the mean age of patient who gave birth after 34 weeks was 32.8 ± 5.6. P value=0.57 which is not significant by using Pearson chi-square test at 0.05 level of significance. 27.6% of the employed patients gave birth <34 weeks and 72.4% of them gave birth ≥ 34 weeks, while for the unemployed patients, 30.3% of them gave birth < 34 weeks and 69.7% of them ≥ 34 weeks. P value=0.79 which is not significant by using Pearson chi-squared test at 0.05 level of significance. 40.9%of the patients who

gave birth < 34 weeks and 59.1% of those who gave birth ≥ 34 weeks had history of passive smoking. 21.6% of patients who gave birth < 34 weeks and 78.4% of patients who gave birth ≥ 34 weeks did not have a history of passive smoking. p value was < 0.05 which was statistically significant.

Table 3 shows the Relation between parity and history of previous evacuation of retained product of conception (RPOC) with birth < 34 Weeks and ≥ 34 Weeks (38.5%) of nulliparous patients delivered < 34 Weeks and (61.5%) of them delivered ≥ 34 Weeks. While the rest of the patient (27.3%) whose their parity were between (1-3) delivered < 34 Weeks and (70.4%) of them delivered ≥ 34 Weeks. (27.3%) of patients whose their parity were ≥ 4 children delivered < 34 Weeks and (72.7%) of them delivered ≥ 34 Weeks. P value=0.79 which is statistically not significant. Also (24.4%) of patients who delivered < 34 Weeks and (75.6%) of patients who delivered ≥ 34 Weeks have history of evacuation of RPOC. And the rest of patients who delivered before or after 34 weeks had no history of evacuation of retained product P value=0.22 which is not statistically significant.

Table 1 Total number of live birth (LB) and neonatal death (ND) in both term and preterm infants

Neonatal outcome	2013	2014
Total number of live birth	18441	19994
Total number of neonatal death	223(1.20%) of LB	274(1.37%) of LB
Total number of term death	49(21.97%) of ND	50(18.25%) of ND
Total number of preterm death	174(78.03%) of ND	224 (81.75%) of ND
≥ 34 week	33(18.97%) of PTB	40(17.86%) of PTB
Before 34 week	141(81.03%) of PTB	184(82.14%)of PTB

Table 2 Demographic characteristic of the studied group

		Weeks of pregnancy			
Variable		**< 34 Weeks**	**≥ 34 Weeks**	**Total**	**P value**
Maternal Age (Years) Mean ± SD		32.1 ± 5.0	32.8 ± 5.6		0.57
Occupation	Employed	8 (27.6%)	21 (72.4%)	29 (100%)	0.79
	Unemployed	20 (30.3%)	46 (69.7%)	66 (100%)	
Passive smoking	Yes	18 (40.9%)	26 (59.1%)	44 (100%)	< 0.05
	No	11 (21.6%)	40 (78.4%)	51 (100%)	
		Weeks of pregnancy			
Variable		**< 34 Weeks**	**≥ 34 Weeks**	**Total**	**P value**
Maternal Age (Years) Mean ± SD		32.1 ± 5.0	32.8 ± 5.6		0.57
Occupation	Employed	8 (27.6%)	21 (72.4%)	29 (100%)	0.79
	Unemployed	20 (30.3%)	46 (69.7%)	66 (100%)	
Passive smoking	Yes	18 (40.9%)	26 (59.1%)	44 (100%)	< 0.05
	No	11 (21.6%)	40 (78.4%)	51 (100%)	

Table 3 Relationship between parity and history of previous evacuation of retained product of conception (RPOC) with birth < 34 weeks and ≥ 34 weeks

		Weeks of pregnancy			
Variable		**< 34 Weeks**	**≥ 34 Weeks**	**Total**	**P value**
Parity	Nulliparous	5 (38.5%)	8 (61.5%)	13 (100%)	0.79
	1 - 3 children	21 (29.6%)	50 (70.4%)	71 (100%)	
	≥ 4 children	3 (27.3%)	8 (72.7%)	11 (100%)	
Evacuation of RPOC	Yes	11 (24.4%)	34 (75.6%)	45 (100%)	0.22
	No	18 (36%)	32 (64%)	50 (100%)	

Published by DiscoverSys | *Bali Med J* 2020; 9(3): 605-612 | doi: 10.15562/bmj.v9i3.1821

Table 4 Distribution of various problems specific to current pregnancy, mode of delivery (MOD), pregnancy outcome between studied groups

Variable		Weeks of pregnancy		Total	P value
		< 34 Weeks	≥ 34 Weeks		
GD	Yes	1 (20%)	4 (80%)	5 (100%)	0.6
	No	28 (31.1%)	62 (68.9%)	90(100%)	
HT	Yes	3(60%)	2(40%)	5 (100%)	0.14
	No	26 (28.9%)	64 (71.1%)	90(100%)	
Mode of delivery(MOD)	NVD	18 (36%)	32 (64%)	50(100%)	0.22
	CS	11 (24.4%)	34 (75.6%)	45(100%)	
Pregnancy outcome	Alive birth	22 (25.3%)	65 (74.7%)	87(100%)	0.001
	Neonatal mortality	7(87.5%)	1 (12.5%)	8(100%)	

Table 5 Distribution of various problems specific to current pregnancy, mode of delivery (MOD) and pregnancy outcome among the studied groups. than 34 weeks in women with cervical cerclage

Variable		Weeks of pregnancy		Total	P value
		< 34 Weeks	≥ 34 Weeks		
Cerclage Type	Elective	27 (29.67%)	64 (70.32%)	91 (100%)	0.39
	Emergency	2(50%)	2(50%)	4 (100%)	
Cervical Cerclage Time/ Weeks of pregnancy	12^{th}-14^{th}	28 (31.4%)	61(68.5%)	89(100%)	0.51
	15^{th}-17^{th}	0 (0.00%)	3 (100%)	3(100%)	
	18^{th}-21^{st}	1(33.33%)	2(66.6%)	3(100%)	
Vaginal Pathological discharge	Yes	15 (48.4%)	16 (51.6%)	31 (100%)	0.01
	No	14 (21.9%)	50 (78.1%)	64 (100%)	
Cervical length (mm)	<25 mm	15(62.5%)	9 (37.5%)	24 (100%)	< 0.001
	≥ 25 mm	11(17.18%)	53(82.8%)	64(100%)	
				Total * 88 case	
Previous loss	None	2(50%)	2 (50%)	4 (100%)	0.16
	1 - 2 Loss	12 (22.6%)	41 (77.4%)	53 (100%)	
	≥ 3 loss	15 (39.5%)	23 (60.5%)	38 (100%)	

* Note:cervical length of 88 cases were available.

Table 6 Multivariate analyses of risk factors associated with preterm birth less

Risk factor score	Sensitivity%	Specificity%	PPV%	NPV%	Accuracy%
1	42.3%	54.8%	28.2	69.4%	51.1%
2	38.5%	82.3%	47.6	76.1%	69.3%
3	15.4%	99%	99%	73.8	75.0%

Table 7 Predictive model for preterm births with less than 34 weeks

Variable	OR	95% CI	P value
Passive smoking	2.52	1.03 – 6.18	0.044
Pathological vaginal discharge	3.35	1.33 – 8.41	0.01
Cervical length (< 25mm)	8.03	2.81 – 22.97	< 0.001

OR=odds ratio
CI=coefficient interval

Distribution of various problems specific to the current pregnancy, mode of delivery (MOD) and pregnancy outcome among the studied groups are shown in Table 4. This table clarifies the relationship between gestational diabetes and hypertension disorder during pregnancy and mode of delivery in previous pregnancies in patients who gave birth < 34 weeks and those gave birth ≥ 34 weeks, which is not significant (P value was > 0.05). P value for pregnancy outcome were significant.

The analysis of the studied risk factors and the relationship of them with preterm birth neonates (<34 weeks) in women underwent cervical cerclage are presented in Table 5. According to the results, there is a non-significant relationship between cerclage timing and cerclage type. However, a significant association was found between the length of cervix at time of cerclage placement and pathological vaginal secretion. A P-value of 0.16 was obtained for prediction of preterm delivery in women before the week 34 of delivery.

Table 6 shows the multivariate analyses of the 3 risk factors of preterm delivery before 34 weeks in women undergone cervical cerclage.

The developed model for prediction of preterm births before 34 weeks is shown in Table 7. The predictive value of the model is 99% for the three risk factors and 47.6% when there are two risk factors but only 28.2% when there is a single risk factor. From 29 cases who gave birth before 34 weeks in our study, 1 patient gave birth <26 weeks.

DISCUSSION

Neonatal mortality and morbidity in preterm infants are directly proportional to gestational age at birth. Each addition gestational week has substantial effect on survival rate as well as good antenatal care. Identifying the model to predict patients with cervical incompetence at risk for preterm delivery before 34 weeks is important for counselling prior to performing cerclage procedures and in identifying the group who require increased surveillance. The quality and availability of intensive neonatal care have a great role in the survival of preterm infants.[33] Table 1 shows the total number of live births and neonatal deaths in Sulaimaniyah, Iraq maternity teaching hospital of Sulaimaniyah, Iraq in 2016 & 2017. Term neonatal deaths accounts for about 1/4 of all neonatal deaths, while 3/4 of the deaths occur among preterm infants. Regarding preterm neonatal deaths, there is a significant relationship between gestational age at birth, about three quarters of preterm neonatal deaths occur in neonates born before 34 weeks. Among the studied groups, there is also a significant relationship between gestational age and neonatal mortality. P-value is 0.001, which is highly significant.

Preterm delivery was more likely in teenage mothers, and this finding is in agreement with the findings of the study by Ali- S Khashar et al.[34] We have discovered that maternal age has no significant risk in this study and all cases were above (18) years. Passive smoking has a significant risk on birth before 34 weeks of pregnancy (P value less than 0.05). These results are in line with the findings of Khader et al. (2011) who reported a significant association between exposure to passive smoking and higher risk of preterm birth.[35] A similar association was also found between passive smoking history and preterm delivery.[36] Contrarily, Andriani et al. could not find a significant association between passive smoking history and preterm delivery in their national prospective longitudinal cohort study.[37] Given the large population of women exposed to passive smoking,[38] such an association between passive maternal smoking and preterm delivery, no matter how small it is, could produce a considerable public health burden.[39]

There is no significant difference regarding history of previous evacuation of RPOC among the studied groups in this study and this was in agreement with the study performed by Madore C et al.,[40] does not demonstrate that cervical dilation during dilatation and curretage predisposes to cervical insufficiency as previously described. Pathological vaginal discharge was present in 32.6% of the studied population. The rate of preterm birth before the week 34 in women with a history of abnormal vaginal discharge was 48.2%, while this rate was 21.9% in those with no history of it. This is in line with the results of the study by Cram et al. who found a significant association between pathological vaginal discharge during gestation and premature birth.[41]

There is high a discrepancy between sample size for emergency and elective cerclage cases. (91case elective, 4 cases emergency) this is adversely affect outcome may lead to false positive or false negative cases. 29.67% of elective cases delivered before 34 weeks and 64 (70.32%) delivered ≥ 34 weeks. For emergency cases, although the percentage of women giving birth before 34 weeks was higher in comparison with the elective cases, it was not statistically significant. The same result was found in the study performed by Cockwell KA, et al., who mentioned that there was no significant difference between the emergency cerclage group and elective cerclage group regarding mean gestational age of delivery, delivery beyond 34 weeks and overall pregnancy outcome.[42] In an Indian study, Khan et al. evaluated the outcomes of elective, urgent, and emergency cerclage and argued that patients with cervical incompetence could benefit from emergency cerclage and the outcomes get better when elective cerclage is done before the onset of

preterm labor process (elective group) and at early stages of cervical alterations (urgent group), rather cerclage placement when incompetence process has already started (Emergency group).[43] Considering the gestational age of the studied population at the time of cerclage placement, three gestational age groups were defined: 12-14 years, 15-17 years, and 18-21 years. There was no significant association between different gestational age groups with delivery before 34 weeks. This was in agreement with the study by Gupta et al. (2013,India) who reported that there was no difference in age groups below 21 week but there is significant relation when cervical cerclage done between 21-26 weeks.[44] The current result is in line with the study by Berghella V et al.[45] who reported a reverse association between the preterm delivery frequency and cervix length as measured by ultrasonography in pregnancy. Women with cervical lengths over than 25 mm had significantly lower risk of preterm birth than those with <25 mm cervical lengths.

CONCLUSION

The results of the present study showed 3 effective risk factors in preterm childbirth before 34 weeks of gestation in women undergoing cervical cerclage. These factors are the history of pathological vaginal discharge during pregnancy, cervical length less than 25 mm before the cerclage placement, and passive smoking. In addition to accurate care for genital tract infection, pregnant women should be informed properly about the negative effects of nicotine exposure on preterm delivery. Women with 3 risk factors were most likely to develop preterm birth. The prediction model designed in our study can be used as a tool for counselling these patients before receiving cervical cerclage in order to identify those women who require frequent surveillance after cerclage placement who may deliver before 34 weeks.

CONFLICT OF INTEREST

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

FUNDING

These authors have no support or funding to report.

ETHICAL CONSIDERATIONS

Approval for this study has been obtained from clinical directorate of Sulaimaniyah maternity hospital, where all the data were collected and consents were taken from all patients participating in this study.

ACKNOWLEDGMENTS

I would like to express Special thanks for all women who are involved in this study and everyone who helps me in conducting this study.

REFERENCES

1. World Health Organization. Preterm birth. Media center fact sheet N 363. Updated November 201.
2. Goffinet f. Primary predictors of preterm labour. BJOG. 2005;112 suppl 1, 38-47.doi:10.1111/j.14710528.2005.00583
3. Moutquin J M. Classification and heterogeneity of preterm birth. BJOG. 2003; 110 suppl 20, 30-33.
4. Han Z, Mulla S, Beyene J, liao G, & Mcdonald S D. Maternal underweight and the risk of preterm birth and low birth weight: a systematic review and meta-analyses. Int J Epidemiol. 2011; 40(1), 65-101. doi: 10.1093/ije/dyq195
5. Kyrklund-Blomberg NB, Granath F, Cnattingius S. Maternal smoking and causes of very preterm birth. Acta Obstet Gynecol Scand. 2005; 84: 572– 577.
6. TikKanen M, Nuutila M, Hiilesmaa V, Paavonen J, Ylikorkala O. Pre-pregnancy risk factors for placental abruption. Acta Obstet Gynecol Scand. 2006; 85:40-44. doi: 10.1080/0001634500324241.
7. Ng SP, Zelikoff JT. Smoking during pregnancy: Subsequent effects on Offspring immune competence and disease vulnerability in later life. Reprod Toxico. 2007; 23:428-437. doi: 10.1016/j.reprotox.2006.11.008.
8. Flood K & Malone F D. Prevention of preterm birth. Semin Fetal Neonatal Med. 2012;17(1), 58-63. doi: 10.1016/j.siny.2011.08.001
9. Parry S, Simhan H, Elovitz M & Iams J. Universal maternal cervical length screening during the second trimester: pros and cons of a strategy to identify women at risk of spontaneous preterm delivery. Am J Obstet Gynecol. 2012; 207(2), 101-106. doi: 10.1016/j.ajog.2012.04.021
10. Russell P. Inflammatory lesions of the human placenta. I. Clinical significance of acute chorioamnionitis. Am J Diagn Gynecol Obstet. 1979; 1:127–37.
11. Goldenberg RL, Culhane JF, Iams JD, Romero R. Epidemiology and causes of preterm birth. Lancet, 2008; 371:75-84.
12. Goldenberg RL, Hauth JC, Andrews WW. Intrauterine infection and preterm delivery. N Engl J Med. 2000; 342:1500–7.
13. Leitich H, Bodner-Adler B, Brunbauer M, et al. Bacterial vaginosis as a risk factor for preterm delivery: a meta-analysis. Am J Obstet Gynecol. 2003; 189:139–47.
14. McDonald H, Brocklehurst P, Parsons J. Antibiotics for treating bacterial vaginosis in pregnancy. Cochrane Database Syst Rev. 2005 ; Jan 25;(1):CD000262. doi: 10.1002/14651858.CD000262.pub2.
15. Romero R, Oyarzun E, Mazor M, et al. Meta-analysis of the relationship between asymptomatic bacteriuria and preterm delivery/low birth weight. Obstet Gynecol. 1989;73:576–82.
16. Leitich h, Kaider A. Fetal fibronectin--how useful is it in the prediction of preterm birth? BjoG.2003; 110 suppl 20, 66-70.
17. Lockwood CJ, Senyei AE, Dische MR, et al. Fetal fibronectin in cervical and vaginal secretions as a predictor of preterm delivery. N Engl J Med. 1991;325:669–74.
18. Feinberg RF, Kliman HJ, Lockwood CJ. Is oncofetal fibronectin a trophoblast blue for human implantation? Am J Pathol. 1991;138:537–43.
19. Yeast JD, Hickok D, Williams C. A positive fetal fibronectin test is associated with a reduced risk of failed induction. Obstet Gynecol. 2004;103:70 S.
20. Honest H, Bachmann LM, Gupta JK, et al. Accuracy of cervicovaginal fetal fibronectin test in predicting risk of spontaneous preterm birth: systematic review. BMJ, 2002;325:1–10.

21. McLean M, Bisits A, Davies J, et al. Predicting risk of preterm delivery by secondtrimester measurement of maternal plasma corticotropin-releasing hormone and alpha-fetoprotein concentrations. Am J Obstetrics & Gynecol. 1999;181(1):207–15.
22. Vogel I, Goepfert AR, Thorsen P, et al. Early second-trimester inflammatory markers and short cervical length and the risk of recurrent preterm birth. J Reprod Immunol. 2007;75(2):133–40.
23. Hassan SS, Romero R, Maymon E, Berry SM, Blackwell SC, Treadwell MC, et al. Does cervical cerclage prevent preterm delivery in patients with a short cervix? Am J Obstet Gynecol. 2001;184:1325–31.
24. Novy J, Gupta A, Wothe DD, Gupta S, Kennedy KA, Gravett MG. Cervical cerclage in the second trimester of pregnancy: A historical cohort study. Am J Obstet Gynecol. 2001;184:1447–56.
25. McDonald IA. Incompetence of the cervix. Aust N Z J Obstet Gynaecol. 1978;18:34-7.
26. Lidegaard O. Cervical incompetence and cerclage in Denmark 1980-1990. A register based epidemiological survey. Acta Obstet Gynecol Scand. 1994;73:35–8.
27. Drakeley AJ, Roberts D, Alfirevic Z. Cervical stitch (cerclage) for preventing pregnancy loss in women. Cochrane Database Syst Rev. 2003; CD003253.
28. Cook CM, Ellwood DA. A longitudinal study of the cervix in pregnancy using transvaginal ultrasound. Br J Obstet Gynaecol. 1996;103:16–8.
29. Heath VC, Southall TR, Souka AP, Elisseou A, Nicolaides KH. Cervical length at 23 weeks of gestation: prediction of spontaneous preterm delivery. Ultrasound Obstet Gynecol. 1998;12:312–7.
30. Iams JD, Goldenberg RL, Meis PJ, Mercer BM, Moawad A, Das A, et al. The length of the cervix and the risk of spontaneous premature delivery. National Institute of Child Health and Human Development Maternal Fetal Medicine Unit Network. N Engl J Med. 1996;334:567–72.
31. Crane JM, Hutchens D. Transvaginal sonographic measurement of cervical length to predict preterm birth in asymptomatic women at increased risk: a systematic review. Ultrasound Obstet Gynecol. 2008;31:579–87.
32. Carvalho MH, Bittar RE, Brizot ML, Maganha PP, Borges da Fonseca ES, et al. Cervical length at 11–14 weeks' and 22–24 weeks' gestation evaluated by transvaginal sonography, and gestational age at delivery. Ultrasound Obstet Gynecol. 2003;21:135–9.
33. Stoll B J, hansen N I, Bell E F, shankaran S, laptook A R, Walsh M C et al. Neonatal outcomes of extremely preterm infants from the NICHD neonatal research network. Pediatrics; 126(3), 443-456. doi: 10.1542.
34. Ali S, Khashar N Baker and Loise C Kenny. Preterm birth and reduced birth weightin first and second teenage pregnancies:a register based cohort study. BMC Pregnancy and Child birth.2010; Volume 10, Article number: 36.
35. Khader YS, Al-Akour N, Alzubi IM, Lataifeh I The association between second hand smoke and low birth weight and preterm delivery. Matern Child Health J. 2011; 15: 453–459. doi: 10.1007/s10995010-0599-2 PMID: 20364365.
36. Qiu J, He X, Cui H, Zhang C, Zhang H, Dang Y, et al. Passive smoking and preterm birth in urban China. Am J Epidemiol. 2014; 180: 94–102. doi: 10.1093/aje/kwu092 PMID: 24838804.
37. Andriani H, Kuo H. Adverse effects of parental smoking during pregnancy in urban and rural areas. BMC Pregnancy Childbirth. 2014; 14: 1210.
38. Vital signs: nonsmokers' exposure to secondhand smoke-United States, 1999–2008. MMWR Morb Mortal Wkly Rep. 2010; 59: 1141–1146. PMID: 20829748.
39. Meeker JD, Benedict MD. Infertility, Pregnancy Loss and Adverse Birth Outcomes in Relation to Maternal Secondhand Tobacco Smoke Exposure. Curr Womens Health Rev. 2013; 9: 41–49. PMID: 23888128.
40. Madore C, Hawes WE. A study on the effects of induced abortion on subsequent pregnancy outcome. Am J Obstet Gynecol. 1981;139:516–521.
41. Cram L F, Zapata M I, Toy E C, Baker B. Genitourinary infections and their association with preterm labor. Am Fam Phys; vol. 65, no. 2, pp. 241–248, 2002.
42. Cockwell HA, Smith GN. Cervical incompetence and the role of emergency cerclage. J Obstet Gynaecol Can; 2005; 27: 123–129.
43. Khan M J, Ali G, Al Tajir G, Sulieman H. Evaluation of Outcomes Associated with Placement of Elective, Urgent, and Emergency Cerclage. J Obstet Gynaecol India. 2012 Dec; 62(6): 660–664. doi: 10.1007/s13224-012-0233-x.
44. Gupta A, Rathore A M, Manaktala U. Risk scoring to predict preterm birth before 34 weeks in women receiving cervical cerclage. In J Biomed Res. 2013;04:02, Journal doi:10.7439/ijbr.
45. Berghella V, Odibo AO, To MS, Rust OA, Althuisius SM. Cerclage for short cervix on ultrasonography: meta-analysis of trials using individual patient-level data. Obstet Gynecol. 2005 ; 106:181–9.

ORIGINAL ARTICLE

Bali Medical Journal (*Bali Med J)* 2020, Volume 9, Number 3: 640-644
P-ISSN.2089-1180, E-ISSN: 2302-2914

Published by DiscoverSys

The functional and physical state of the anal sphincter complex in the patients with rectal prolapse in the post-surgery period

Solmaz Soltan Imanova[1*]

ABSTRACT

Purpose: The work was aimed at comparative studying of the functional and physical state of the patients with rectal prolapse after surgical treatment with various surgical techniques and at identifying the most optimal procedure technique.

Patients and methods: The authors observed 49 patients (32 women, or 65.3 %) aged 22 — 83 years (the median age of women was 46.1 ± 1.3 years old, of men — 48.7 ± 1.4 years old) with the rectal prolapse of varying severity. The Delorme's procedure was indicated for 28 patients (57.1 %). Perianal proctosigmoidectomy (the Altemeier's surgery) was performed in 12 patients (24.5 %). In the young patients, preference was given to the Ripstein's abdominal surgery (nine patients; 18.4 %). To objectively assess the physical state of the anal sphincter apparatus, traditional sphincterometry was performed using S4402 sphincterometer with a nonperfusing sensor (Pro Medika GmbH, Germany), and the functional state of the sphincter complex was subjectively assessed using the Wexner's score scale.

Results: The best results were obtained after the Delorme's procedure ($p<0.05$), while the worse results were obtained in the young patients after the Ripstein's surgery ($p<0.05$).

Conclusion: The obtained results may be used for assessing the functional and physical state of the anal sphincter complex in the surgical treatment of the patients with the rectal prolapse syndrome, especially in those with ASFs of varying severity.

Keywords: rectal prolapse, anal sphincter failure, chronic constipation, fecal incontinence, sphincterometry
Cite this Article: Imanova, S,S. 2020. The functional and physical state of the anal sphincter complex in the patients with rectal prolapse in the post-surgery period. *Bali Medical Journal* 9(3): 640-644. DOI: 10.15562/bmj.v9i3.1790

[1]Department of Surgical Diseases, Azerbaijan Medical University, Baku, Azerbaijan

*Corresponding to:
Solmaz Soltan Imanova;
Department of Surgical Diseases, Azerbaijan Medical University, Baku, Azerbaijan, Bakikhanov str., 23, Baku, AZ1022, Azerbaijan;
imanova.solmaz@bk.ru

Received: 2020-04-05
Accepted: 2020-09-26
Published: 2020-10-21

INTRODUCTION

Rectal prolapse syndrome (RPS) is a severe pathosis. It is characterized by the mucous membrane prolapse and other layers of the rectum due to the relaxation of the pelvic and perineal muscles and ligaments in the deep Douglas pouch.[1,2] The first scientific ideas and the first method of surgical treatment (suturing of the Douglas pouch) were proposed by Moschowitz A. V. in 1912. However, the results were unsatisfactory, the relapse developed in 80 % of the cases.[3]

The incidence of RPS in the adult population is within one to a thousand; it is found in all age groups, more frequently in the adults, especially in women who in the age of over 50 years are six times more likely to suffer partial or complete rectal prolapse than the men.[4,5] The previous idea of RPS association with multiple difficult deliveries is refuted because this state occurs in about one-third of the nulliparous women. In 31 % of the cases, the disease develops in the persons engaged in heavy physical work.[6] In the middle-aged and older women, the bladder and colon dysfunction develops in 25 % of the cases due to the pelvic floor descent. Therefore, the patients complain urinary incontinence in 16 % of the cases, and in 9 % of the cases — of fecal incontinence, and in 3 % of the cases, the symptoms of the pelvic organ (rectum, bladder, vagina, uterus) prolapse are manifested.[6,7]

In RPS complicated by anal sphincter failure (ASF), the cardinal symptom is fecal incontinence due to which perianal ulcers, ulcerations, and skin maceration develop at later stages in 0.8 – 18 % of the cases, as well as ascending urogenital infections, sometimes accompanied by psychoemotional disorders ranging from self-isolation and depression to complete disability and suicide. Disproportionate visits to the doctor are characteristic, i.e., only 10 – 30 % of the patients with ASF contact medical institutions.[8,9]

The formation of feces and fecal continence depends on the coordinating activity of several factors: the geometric, elastic, and fixing properties of the anal sphincter muscles; the values of the anorectal angle; the motor-evacuation activity of the colon, and the interaction of the rectum receptor apparatus with the anal canal, neural pathways, spinal cord, and brain.[1,10] Naturally, the central role in fecal and gas continence belongs to

the sphincter-locking complex (apparatus) of the rectum[10] since the regular activity of this complex is ensured by the internal smooth (70 – 80 %) and the external cross-striated (20 – 30 %) sphincter muscles. Voluntary activity is mainly provided by the external sphincter muscle and the pelvic floor muscles.[11]

The severity of ASF is determined by many scales, systems, and indexes proposed at various times. In recent decades, the Wexner's fecal incontinence scale of the Cleveland Clinic (USA, Ohio) has been most frequently used in surgical practice.[8,12] Its main disadvantage is the fact that it is based on the subjective feelings of the patient, since the subjective factors (physical feelings, complaints) are insufficient for choosing the treatment policy, the method of surgery and its extent, further rehabilitation treatment, and the medical rehabilitation measures.[4,11] Therefore, studying the pre- and post-surgery objective parameters (sphincterometric, manometric, electromyographic, etc.) and their clinical and mathematical interpretation are of great importance.

Given the above, the need to study the functional and physical (objective) state of the anal sphincter complex in the perisurgical period in the case of RPS is considered necessary, and therefore the expediency of this study is of clinical importance.

The aim of the study

The work was aimed at comparative studying of the functional and physical state of the patients with rectal prolapse after surgical treatment with various surgical techniques and at identifying the most optimal procedure technique.

MATERIAL AND METHODS

This work was performed in 2017 – 2019 at the educational and surgical clinic of the Azerbaijan Medical University and involved 49 patients (32 women, or 65.3 %) at the age of 22 — 83 years (the median age of women was 46.1 ± 1.3 years old, of men — 48.7 ± 1.4 years old) with rectal prolapse of varying severities. In the past medical history, 23 women (71.9 %) indicated severe traumatic deliveries (2 to 4). The average observation period was 16.1 ± 2.2 months (4 to 21.6 months) ($p > 0.05$). All patients were informed about the research and had given written permission.

In order to prevent statistical distortions and potentially distorting factors, exclusion criteria were determined: patients with concomitant diseases of the cardiovascular system, respiratory system, severe renal (hepatic) failure, diabetes mellitus, and the ones who previously underwent surgery in the anorectal region, experienced complex surgical interventions in the abdominal cavity, especially in its lower part.

Clinical material was collected, and data of laboratory and instrumental studies were taken from the electronic database of the Department of Surgical Diseases-I.

To objectively assess the physical state of the anal sphincter apparatus, traditional sphincterometry was performed using S4402 sphincterometer with a nonperfusing sensor manufactured by Pro Medika GmbH (Germany). With that, the quantitative (physical) indicators and their graphic images obtained by processing these data with the corresponding program were displayed on the PC screen.

Sphincterometry can obtain indicators, such as the strength of the anal muscles (the internal and external sphincters, and the pubic and rectal and levator muscles), which directly ensure fecal and gas continence, and the degree of their contraction and relaxation. The indications for this study were fecal and gas incontinence, chronic constipation, anismus, anal stenosis (pectenosis), anal fissure, rectal and rectovaginal fistulas, unidentified and idiopathic anal pains, rectocele, inflammatory diseases of the rectum and the colon, solitary rectal ulcer, etc.

The methods of sphincterometry

The study was performed in the morning hours after the first defecation without prior special preparation of the patients. However, the use of laxatives (Fortrans, Pikoprep, DulcoSoft, etc.) one day before the examination was advisable. Cleansing enemas on the eve of the examination were not recommended, since the excessive relaxation of the anal muscles might lead to the distortion of the results due to the reduction of their power. The patient was lying on his/her side with the knees as close to the belly as possible. A surgical glove was put on the nonperfusing sensor, which was carefully introduced into the anal canal to the depth of 3.0 – 3.5 cm with a lubricant applied. After waiting a short while (for the patient adaptation to the device), the necessary indicators were recorded: at rest for the first 20 seconds, followed by two times within five seconds, and finally at the moment of voluntary contraction.

The following sphincterometric indicators were measured: the average pressure at rest, the tonicity of the anal sphincter, the voluntary contractile pressure, and the arbitrary contractile gradient (for determining the functional state of the muscle tissue). The indicators of other functional tests were also determined (upon straining, upon severe coughing).

The Delorme's procedure had been indicated for 28 patients (57.1 %), after which no complications requiring additional surgical treatment were observed. Local infectious complications (wound abscess in two cases) were treated conservatively. Relapse was observed in two cases (7.1 %). Perianal proctosigmoidectomy (the Altemeier's surgery) was performed in 12 patients (24.5 %). With that, in the early post-surgery period, local purulent infectious complications developed (wound abscess in two cases, purulent abscess of retrorectal space in one case). Relapse was observed in only one case (8.3 %).

In young patients, preference was given to the Ripstein's abdominal surgery (nine patients, or 18.4 %). No post-surgery complications and disease relapse were observed.

Before surgery, the severity of ASF had been determined based on the corresponding sphincterometric indicators. The degree I was found in 21 cases (37.3 %), degree II — in 17 cases (34.7 %), and degree III — in 11 cases (22.45 %); the functional state of the sphincter complex was subjectively assessed using the Wexner's score scale.

The mathematical results were processed in the Inc.20.0 version of the SPSS Statistics (Statistical Package for the Social Sciences) application. The indicators in the groups were taken by the variation series; for each series, the average value (M), its standard deviation (m), the maximum (max), and the minimum (min) values were calculated. The difference between the quantitative variables was studied using the Pearson's χ^2 test. The statistical significance of the differences was assessed using the Student's t-test and Wilcoxon's U-test (Mann-Whitney). The differences in the assessment with $p < 0.05$ were considered veracious.

RESULTS

Given the degree of ASF severity and the gender, the indicators of sphincterometry after surgical treatment of the rectal prolapse were grouped and classified (Table 1).

With all ASF severity degrees, the sphinterometric data allowed building the reference interval. The values at rest were greater in the women, while all other results (the maximum contractile pressure, the average contractile pressure, the arbitrary contractile gradient) were greater in the men.

The same results were comparatively studied after using various surgical techniques (Table 2). With that, the best results were obtained after the Delorme's procedure, while worse results were obtained in the young patients after the Ripstein's surgery. For instance, after the Delorme's procedure, the indicators in four patients with ASF degree III became close to those of degree II, in nine patients with ASF degree II, they became close to those of degree I, and in the rest of patients (15 patients, or 53.6 %), they became close to the norm; and after the Altemeier's surgery — in three, five, and four patients, respectively. After the Ripstein's surgery, similar indicators in four patients with degree III corresponded to those of degree II, in three patients — to those of degree I, and in two patients, they became close to the norm. In one patient after the Delorme's procedure and in two patients after the Altemeier's surgery, in the long-term period (six to fifteen months), anal stenosis developed, which required appropriate surgical treatment.

Before surgery and in the post-surgery period, as well as in the reference studies, the degree of fecal incontinence was assessed using the Wexner's score scale (Table 3).

Table 1. The sphincterometric indicators in the case of rectal prolapse with various severity degrees in the patients with the ASF

Parameters (mm Hg)	Severity degree	Women (results/norm limits)	Men (results/norm limits)	p
The average pressure at rest	I	36.3 – 40.0 (38.1 ± 1.6) / (41 – 63)	32.8 – 42.0 (37.5 ± 1.0) / (43 – 61)	< 0.05
	II	26.9 – 36.2 (30.25 ± 1.3)	25.3 – 32.7 (29.45 ± 0.7)	< 0.05
	III	≤ 26.8 (24.7 ± 2.2)	≤ 25.2 (24.9 ± 0.8)	< 0.001
The maximum contractile pressure	I	97.4 – 109.0 (102.5 ± 3.7) / (110.0 – 178.0)	115.0 – 120.0 (118.15 ± 2.8) / (121 – 227)	< 0.05
	II	61.9 – 97.3 (78.8 ± 4.4)	74.9 – 114.9 (97.0 ± 4.8)	< 0.05
	III	≤ 61.8 (55.75 ± 3.6)	≤ 74.8 (68.85 ± 3.2)	< 0.001
The average contractile pressure	I	68.8 – 87.0 (79.35 ± 4.1) / (88.0 – 146.0)	89.5 – 105.0 (95.9 ± 4.1) / (106 – 190)	< 0.05
	II	46.0 – 68.7 (52.3 ± 2.9)	53.0 – 89.4 (76.2 ± 3.7)	< 0.05
	III	≤ 45.9 (40.8 ± 3.5)	≤ 52.9 (47.9 ± 2.85)	< 0.05
The voluntary contractile gradient	I	≥ 73.6* (68.9 ± 4.05) / (59 – 115)	≥ 79.5* (75.95 ± 3.1) / (78 – 166)	< 0.05
	II	35.9 – 58.0 (47.7 ± 3.0)	49.9 – 77.0 (61.25 ± 3.0)	< 0.05
	III	≤ 35.8 (32.9 ± 1.6)	≤ 49.8 (46.0 ± 2.7)	< 0.05

Table 2. **The sphincterometric indicators after surgery with the use of various techniques in the case of rectal prolapse, depending on the ASF severity degree**

Parameters (mm Hg)	Severity degree	Women			Men			p
		After the Delorme's procedure	After the Altemeier's surgery	After the Ripstein's surgery	After the Delorme's procedure	After the Altemeier's surgery	After the Ripstein's surgery	
The average pressure at rest	I	36.9 - 42.2 (39.3 ± 1.1)	34.2 - 40.9 (37.6 ± 1.5)	33.5 - 41.8 (36.2 ± 1.5)	31.9 - 42.5 (37.6 ± 1.7)	36.1 - 42.7 (39.0 ± 1.9)	35.2 - 42.9 (38.3 ± 1.7)	< 0.05
	II	29.0 - 36.85 (31.5 ± 1.0)	26.5 – 34.1 (29.6 ± 1.7)	26.15 – 33.4 (28.7 ± 1.9)	25.8 – 31.8 (27.75 ± 0.9)	29.6 – 36.0 (32.8 ± 1.5)	28.6 – 35.1 (31.8 ± 1.5)	< 0.05
	III	≤ 28.95 (25.0 ± 2.3)	≤ 26.0 (23.7 ± 2.2)	≤ 26.1 (24.1 ± 2.0)	≤ 25.7 (23.8 ± 0.6)	≤ 29.5 (25.3 ± 2.9)	≤ 28.5 (26.0 ± 2.3)	< 0.05
The maximum contractile pressure	I	97.5 - 110.4 (102.7 ± 3.1)	95.0 - 107.7 (98.7 ± 2.4)	93.0 - 105.9 (98.3 ± 2.7)	115.0 - 120.0 (118.15 ± 2.8)	98.2 - 110.6 (102.5 ± 4.9)	95.1 - 109.3 (99.7 ± 3.4)	< 0.001
	II	62.0 - 97.4 (79.4 ± 3.9)	60.35 - 94.9 (77.9 ± 3.2)	60.1 - 92.9 (76.55 ± 3.0)	75.2 - 114.9 (96.05 ± 4.4)	68.7 - 98.1 (81.5 ± 3.8)	65.8 - 95.0 (79.2 ± 3.8)	< 0.05
	III	≤ 61.9 (56.2 ± 3.0)	≤ 60.3 (53.5 ± 2.7)	≤ 60.0 (54.9 ± 2.2)	≤ 75.1 (67.5 ± 3.15)	≤ 68.6 (59.25 ± 3.3)	≤ 65.7 (60.4 ± 3.1)	< 0.001
The average contractile pressure	I	69.7 – 88.25 (79.5 ± 3.7)	67.2 – 85.1 (77.2 ± 3.0)	65.5 – 81.9 (75.85 ± 4.2)	88.5 – 103.6 (95.9 ± 4.1)	70.1 – 89.6 (81.4 ± 3.5)	68.6 – 85.2 (79.8 ± 3.4)	< 0.05
	II	46.45 – 69.6 (52.7 ± 2.4)	44.4 – 67.1 (51.5 ± 2.0)	42.9 – 65.45 (49.8 ± 2.6)	54.2 – 88.4 (75.8 ± 3.0)	48.9 – 70.0 (62.25 ± 2.3)	48.4 – 68.5 (54.0 ± 2.3)	< 0.05
	III	≤ 46.4 (41.8 ± 3.3)	≤ 44.35 (39.6 ± 2.9)	≤ 42.8 (38.9 ± 3.0)	≤ 54.1 (48.0 ± 2.55)	≤ 48.8 (43.3 ± 2.5)	≤ 48.3 (41.1 ± 3.7)	< 0.05
The voluntary contractile gradient	I	64.2 – 76.7 (68.5 ± 3.2)	63.5 – 74.9 (66.15 ± 2.8)	63.1 – 75.5 (65.6 ± 3.1)	69.9 – 76.2 (73.5 ± 3.0)	63.5 – 74.9 (66.15 ± 2.8)	66.7 – 74.2 (70.3 ± 4.0)	< 0.05
	II	35.9 – 64.1 (47.7 ± 3.0)	34.0 – 63.4 (47.2 ± 2.6)	33.2 – 63.0 (45.75 ± 3.1)	56.5 – 69.8 (63.35 ± 3.2)	41.7 – 63.4 (54.4 ± 2.9)	45.9 – 66.6 (58.5 ± 3.7)	< 0.05
	III	≤ 35.85 (33.0 ± 1.2)	≤ 33.9 (32.5 ± 1.0)	≤ 33.15 (32.2 ± 1.7)	≤ 56.4 (46.0 ± 2.7)	≤ 41.6 (37.7 ± 1.4)	≤ 45.8 (42.7 ± 1.0)	< 0.05

Table 3. **Assessment of the degree of fecal incontinence using the Wexner's score scale**

The time of determination	Delorme's procedure (n = 28)	Altemeier's surgery (n = 12)	Ripstein's surgery (n = 9)
Before surgery	8.3 ± 2.1	8.1 ± 3.5	8.7 ± 3.3
After surgery	4.6 ± 2.7	4.4 ± 2.9	4.7 ± 3.0
p	p = 0.015	p = 0.017	p = 0.0092

DISCUSSION

The sphincterometric indicators were different, depending on the age, gender, and the physical state. For instance, according to A.P. Zbar et al., at rest, the strength of the rectal sphincter muscles obturator was within 60 mm Hg, in the patients with fecal and gas incontinence — 40 mm Hg, during anal relaxation — 55 mm Hg, and in the patients with anal fissure — 85 mm Hg. At rest, 65 – 85 % of the anal sphincter apparatus strength was provided by the anal muscles. The maximum strength of these muscles in healthy individuals was 203 mm Hg. In the patients with fecal and gas incontinence — 114 mm Hg, during anal relaxation — 146 mm Hg, and the patients with anal fissure — 233 mm Hg.[13] At the moment of relaxation of the anal muscles and the muscles in the anterior abdominal wall, the maximum strength in the patients with fecal and gas incontinence was much lower compared to healthy individuals. However, this value was significantly higher in patients with anismus and anal fissure.

The results of the authors were insignificantly different from those in the literature of recent years.[7,14,15] In the authors' opinion, the unsatisfactory results of surgical treatment are related to the late patients' visits to the hospital, duration, and severity of the disease, and the inadequate choice of the surgical approach.

CONCLUSION

Thus, the obtained results may be used for assessing the functional and physical state of the anal sphincter complex in the surgical treatment of the patients with RPS, especially in those with ASFs of varying severity.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

FUNDING

The study has not been funded.

ETHICAL CLEARANCE

Ethical approval was obtained by the Academic Council of the Faculty of I General Medicine of Azerbaijan Medical University prior to the study being conducted.

AUTHOR CONTRIBUTION

All authors contributed equally.

ABBREVIATIONS

RPS, rectal prolapse syndrome; ASF, anal sphincter failure.

REFERENCES

1. Parks AG, Swash M, Urich H. Sphincter denervation in anorectal incontinence and rectal prolapse. Gut. 1977. 18:656 doi:10.1136/gut.18.8.656
2. Fomenko OY, Shelygin YA, Popov AA, et al. Funktsionalnoe sostoyanie myshts tazovogo dna u bolnykh s rektotsele [The functional state of the pelvic floor muscles in the patients with rectocele]. *The Russian Bulletin of the obstetrician-gynecologist*. 2017;17(3):43–48. https://doi.org/10.17116/rosakush 201717343-48.
3. Moschowitz AV. The pathogenesis, Anatomy and Cure of prolapse of the Rectum. *Surg. Gynec. Obstet*. 1912;15:7–21.
4. Podmarenkova LF, Aliyeva EI, Poletov NN, et al. Rol funktsionalnykh metodov issledovaniya zapiratelnogo apparata pryamoi kishki v vyyavlenii patogeneticheskikh mekhanizmov analnoi inkontinentsii [The role of functional methods for studying the rectum obturator apparatus for identifying the pathogenetic mechanisms of anal incontinence]. *Coloproctology*. 2006;2(16):24–30.
5. Aliev EA, Akhmedova EV. Prolaps tazovykh organov [Prolapse of the pelvic organs]. *Coloproctology*. 2016;2(56):42–47.
6. Regadas FSP, Abedrapo M, Cruz JV, et al. Apex technique in the treatment of obstructed defecation syndrome associated with rectal intussusception and full rectal mucosa prolapse. *Dis. ColonRectum*. 2014;57:1324-1328 doi: 10.1097/DCR.0000000000000229
7. Aliev EA. Prichiny i profilaktika nedostatochnosti analnogo sfinktera [The reasons for and prevention of anal sphincter failure]. *Bulletin of the National Pirogov Medical Surgical Center*. 2011;1(6):48–53.
8. Koughnett JM, Wexner SD. Current management of fecal incontinence: choosing amongst treatment options to optimize outcomes. *World Journal of Gastroenterology*. 2013;19(48):9216–9230 doi:10.3748/wjg.v19.i48.9216
9. Hori T, Yasukawa D, Machimoto T, et al. Surgical options for full-thickness rectal prolapse: current status and institutional choice. *Ann Gastroenterol*. 2018;31(2):188–197. doi:10.20524/aog.2017.0220
10. Naldini G, Fabiani B, Menconi C, et al. Treatment of obstructed defecation syndrome due to rectocele and rectal intussus caption with a high volume stapler. *Tech Coloproctol*. 2018;22(1):53–58. doi:10.1007/s10151-017-1696-7
11. Kohler A, Athanasiadis S. The value of posterior levator repair in the treatment of anorectal incontinence due to rectal prolapse – a clinical and sphincterometric study. *Langenbeck's Arch Surg*. 2001;386(3):188–192.
12. Regadas FSP, Murad-Regadas SM, Wexner SD, et al. Anorectal three-dimensional endosonography and anal manometry in assessing anterior rectocele in women: a new pathogenesis concept and the basic surgical principle. *Colorectal Dis*. 2007;9:80–85. https://doi.org/10.1111/j.1463-1318.2006.01088.x
13. Zbar AP, Aslam M, Hider A, et al. Comparison of vector volume manometry with conventional manometry in anorectal dysfunction. *Tech Coloproctol*. 1998;2:84–90.
14. Menekse E, Ozdogan M, Karateke F, et al. Laparoscopic rectopexy for solitary rectal ulcer syndrome without overt rectal prolapse: a case report and review of the literature. *Ann ItalChir*. 2014;85:pii/S2239253X14022208.
15. Koizumi N, Kobayashi H, Fukumoto K. Massive chronic irreducible rectal prolapse successfully treated with Altemeier's procedure. *J. Surg Case Rep*. 2018;4:rjy064. doi: 10.1093/jscr/rjy064