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The role of neutrophil-to-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) in determining the prognosis of patients with testicular cancer (<https://www.balimedicaljournal.org/index.php/bmj/article/view/2977>)

Syah Mirsya Warli, David Ralph Lienhardt Ringoringo, Bungaran Sihombing, Ginanda Putra Siregar, Fauriski Febrian Prapiska

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Bacteriuria in pregnancy in Sanglah Hospital: a descriptive study (<https://www.balimedicaljournal.org/index.php/bmj/article/view/3155>)

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Changes in plasma levels of IL-6 and D-dimer in high-risk thrombosis cancer patients undergoing chemotherapy (<https://www.balimedicaljournal.org/index.php/bmj/article/view/3162>)

Budi Setiawan, Amelia KW Manurung, Alif Adlan Zulizar, Widi Budianto, Tri Wahyu Sukarnowati, Eko Adhi Pangarsa, Damai Santosa, Rahajuningsih Dharma Setiabudy, Catharina Suharti

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Increasing dental and oral health knowledge through health promotion of demonstration (<https://www.balimedicaljournal.org/index.php/bmj/article/view/3114>)

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Predictive factors and the relationship between the early detection of osteoporosis and pathological fractures in Indonesian menopausal women (<https://www.balimedicaljournal.org/index.php/bmj/article/view/3258>)

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Relationship between CD4 levels and mucocutaneous manifestations in HIV-AIDS patients at Dr. Soetomo General Academic Teaching Hospital, Surabaya, Indonesia
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Correlation between sociodemographic and attitude of Malang citizens about self medication on urticaria
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Factors that influence on Islamic caring behavior
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Comparison of serum and vitreous TGF- β 1 levels in proliferative diabetic retinopathy with and without panretinal photocoagulation laser therapy
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The effect of metformin on autophagy by LC3 expression in Type 2 Diabetes Mellitus (T2DM) human skeletal muscle cell culture
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Change in ratio levels of KIM-1 / urine creatinine and increase serum creatinine levels in human immunodeficiency virus (HIV) patients receiving tenofovir-based antiretroviral (ARV) combination therapy
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I Dewa Gede Teguh Krisna Murti, I Ketus Agus Somia, I Gde Raka Widiana

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The outcome of hypospadias surgery and it's advanced treatment in Arifin Achmad General Hospital in January 2019 – December 2020
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Evaluating Low Values of Early Diastolic Velocity (e') as a Predictor of Major Cardiovascular Events in Patients with Acute Myocardial Infarction
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The prevalence and characteristics of perineal rupture during vaginal delivery at Sanglah General Hospital and Regional Hospitals in Bali from January 2018 until December 2019 period
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Clinical and radiological profiles of metastatic brain tumor in Indonesia: A study at Dr. Soetomo Hospital, Surabaya
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The effect of workload and length of work on the occurrence of fatigue in workers in the informal industry
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Exploring the role of the combination of propolis and vitamin D3 on VCAM-1 and Caspase-3 expression in preventing atherosclerosis in chronic kidney disease rats
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Relationship between plasma adiponectin levels and cellulite
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Sari Indriyani, Imam Budi Putra, Nelva Karmila Jusuf

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Combination of diabetic Foot Spa and Sauna Bathing Therapy Decreases the Level of Blood Glucose

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The difference of platelet-white blood cell ratio in severe preeclampsia and normotensive pregnancy
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The effect of Epigallocatechin-3-Gallate (EGCG) combined with low dose sorafenib in apoptosis and Platelet-Derived Growth Factor Receptor (PDGFR) expression in hepatocellular carcinoma rats
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Relationship of age, body mass index (BMI), physical activity, salt intake, and stress with high blood pressure among rural dwellers in Kudat, Sabah
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Mitomycin C, curcumin, and fibrin glue inhibit the cell proliferation and expression of TGF- β in human pterygium fibroblast
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Clinical improvement of patients with moderate-to-severe psoriasis treated with methotrexate at Dr. Soetomo General Hospital, Surabaya, Indonesia
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Features of COVID-19 adult patients and the treatment in Indonesia: a retrospective cohort study
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The efficacy of probiotics supplementation on the lipid profiles of obese adolescents : a randomized trial
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Hematology profile of under five years old children suffered from acute diarrhea at Idaman Banjarbaru Hospital, Indonesia
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Harapan Parlindungan Ringoringo, Jun Rahmawati Surya Mentari, Roselina Panghiyangani, Edi Hartoyo, Rahmiati Lao

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Role of malnutrition inflammation score and interleukin-6 on quality of life of regular hemodialysis patients
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Comparison of effects and differences in duration between exposure to conventional cigarette smoke and electronic cigarette vapors on changes in the number of hippocampal pyknotic pyramidal cell
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Characteristics of COVID-19 patients with malignancies comorbidity in Sanglah General Hospital, Bali, Indonesia
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Early detection of elevated liver function test in drug-resistant tuberculosis with short term therapy and individual therapy
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The relationship of tumor necrosis factor alpha levels and neutrophils with skin wound age caused by sharp trauma
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M. Husni Cangara, Indah Wulan Sari, Berti Julian Nelwan, Cahyono Kaelan, Gunawan Arsyadi

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Profile of melasma patients in dermatology and venerology outpatient clinic Dr. Soetomo General Academic Hospital, Surabaya, Indonesia
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3182>)

Apriliin Krista Devi, Budi Utomo, Diah Mira Indramaya, Muhammad Yulianto Listiawan, Sawitri, Dwi Murtiastutik, Cita Rosita Sigit Prakoeswa

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Correlation between antenatal magnesium sulfate (MgSO₄) total dose and delivery time interval with umbilical cord blood brain-derived neurotrophic factor (BDNF) levels as a neuroprotection strategy in preterm birth
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Muhammad Adrianes Bachnas, Sri Sulistyowati, Uchti Akbar

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Analysis of RGB range value on fingernail image for detecting diabetes mellitus risk

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The role of revascularization on short-term Heart Rate Variability (HRV) and Signal Averaged Electrocardiogram (SAECG) in Stable Coronary Artery Disease (CAD)
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Janry Pangemanan, Agnes Lucia Panda, Victor Giovannie Xaverison Rooroh, Evan Jim Gunawan

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Methylenetetrahydrofolate reductase (MTHFR) C677T polymorphism rather than homocysteine increase the risk of ischemic stroke-associated executive dysfunction
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Herpan Syafii Harahap, Muhammad Akbar, Andi Kurnia Bintang, Jumraini Tammasse, Andi Alfian Zainuddin

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Ima Kurniastuti, Ary Andini, Sabrina Ifahdini Soraya

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ORIGINAL ARTICLE

Self-acceptance of patients that received hemodialysis
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3106>)

Lono Wijayanti, Erika Martining Wardani, Difran Nobel Bistara, Siti Nur Hasina, Iis Noventi

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Ondansetron and metoclopramide: a comparative analysis of effectiveness and cost in hospitalized patients with hyperemesis gravidarum
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Lonah, Purwastyastuti, Nafrialdi, Irwinda R, Via Dolorosa Halilintar

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User interface design of Be-Health application for children's learning with a gamification approach
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3111>)

Muhammad Wahyudi, Herwanda Ayu Destania, Rochmat Rizky Alfandi, Tri Sagirani

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Development of patient safety learning module based on problem based learning for nursing students at the College of Health Sciences
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ORIGINAL ARTICLE

The relationship between diabetes distress and HbA1C level in type 2 diabetes mellitus therapy patients: a systematic review
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Zefo Kiyosi Wibowo, Sony Wibisono Mudjanarko, Khairina Khairina

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Bioinformatics assessment on the potential of Lipoteichoic Acid (LTA) of Lactic Acid Bacteria (LAB) as topical therapy for inflammatory skin diseases
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3025>)

Radityastuti, Anang Endaryanto, Ingrid Suryanti Surono, Mohamad Amin, Cita Rosita Sigit Prakoeswa

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The effect of antihypertensive monotherapy and combination on blood pressure in stroke patients
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Ema Pristi Yunita, Saffana Qolby Mayana, Zamroni Afif

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Comparison of prognostic models for severe burn patients in an Indonesian tertiary hospital: retrospective study
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3378>)

Eunice Geraldine Oenarta, Agus Roy Rusly Hariantana Hamid, I Gusti Putu Hendra Sanjaya, I Made Suka Adnyana, Tjokorda Gede Bagus Mahadewa, I Wayan Harimawan Agustinus

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Effect of proteasome inhibitor on serum 8-OHdG and aortic SOD2 in a rat model of atherosclerosis
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3126>)

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Patient preferences for surgery or non-surgery for the treatment of clavus and callus at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3264>)

Arisia Fadila, Iskandar Zulkarnain, Muhammad Yulianto Listiawan, Budi Utomo, Maylita Sari, Irmadita Citrashanty, Bagus Haryo Kusumoputro

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The relationship between catheter placement and the incidence of urinary tract infections in Condong Catur Hospital, Yogyakarta
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3091>)

Kusbaryanto Kusbaryanto, Diana

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Soil worms (*Lumbricus rubellus*) as feed additives for piglets' growth, blood profile and immunomodulators
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3190>)

Anak Agung Gde Oka Dharmayudha, Ida Bagus Komang Ardana, Ketut Budiassa, I Made Merdana, I Wayan Nico Fajar Gunawan

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Depot Medroxyprogesterone acetate reduces spermatogonia cells and spermatid cells in the seminiferous tubules of male mice
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Bagus Komang Satriyasa, I Gusti Ayu Widiyanti, I.B.G. Fajar Manuaba

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A structural model of Mapalus culture, health behavior and coronary artery disease incidence in the Minahasa ethnic community in North Sulawesi Province
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/2814>)

Jeini Ester Nelwan, Oksfriani Jufri Sumampouw, Adisti Aldegonda Rumayar, Franckie Maramis, Odi Roni Pinontoan, Ester Musa, Jansje Ticoalu, Edi Widjajanto

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A comparison of walking ability between the dynamic hip screw and cephalomedullary nailing fixations in intertrochanteric femur fracture
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Karya Triko Biakto, Idrus Andi Paturusi, Harry Supratama Azis, Luky Tandio Putra, Jorvin Kurniawan

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Sri Andreani Utomo, Abdul Hafid Bajamal, Yuyun Yueniwati Prabowowati Wadjib, Irwan Barlian Immadoel Haq, Vivid Umu Varidha, Dyah Fauziah

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The potential effect of intradermal Botulinum Toxin Type-A (BTA) injection to increase extended random skin flap survival
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3026>)

Caroline Fiona, Iswinarno Doso Saputro, Agus Santoso Budi

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Persistence of anti-Salmonella O9 IgM as measured by Tubex® TF may contribute to the over-diagnosis of typhoid fever in endemic areas
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3035>)

I Wayan Adi Pranata, Aly Diana, Marco R Heryanto, Nurhayati Lukman, Herman Kosasih, Hofiyya Djauhari, Deni PR Butarbutar, Susana Widjaja, Bachtli Alisjahbana

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Seroprevalence SARS-CoV-2 among the academic population of Universitas Gadjah Mada Yogyakarta
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/2946>)

Osman Sianipar, Umi Solekhah Intansari, Tri Ratnaningsih, Arum Tri Wahyuningsih, Fuad Anshori, Alfin Harjuno Dwiputro, Adika Zhulhi Arjana

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Early menarche, menstrual duration with dysmenorrhea in adolescents in Surabaya
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3109>)

Nety Mawarda Hatmanti, Yurike Septianingrum, Afita Riah, Firdaus, Ima Nadatien, Siti Maimunah

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The role of apparent diffusion coefficient in differentiating typical from atypical meningioma

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The effect of ACTH4-10Pro8-Gly9-Pro10 on neurotrophin-3 expression in Sprague Dawley rat on acute spinal cord injury
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3143>)

Made Gemma Daniswara Maliawan, Eko Agus Subagio, Budi Utomo, Muhammad Arifin Parenrengi, Asra Al Fauzi, I Ketut Sudiana

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High level of highly sensitivity c-reactive protein levels (hs-CRP) as a risk factor for preterm delivery
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/2966>)

Marthin Kolelupun, I Gede Putu Surya, I Nyoman Hariyasa Sanjaya, Tjok Gde Agung Suwardewa, I Wayan Megadhana, I Gede Mega Putra, I Nyoman Gede Budiana, I Wayan Artana Putra

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Retrospective Study on Very Early Relapse of Childhood Acute Lymphoblastic Leukemia at a Reference Centre in Indonesia
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/2495>)

Nur Melani Sari, Namira Assyfa Nurazizah, Ronny Lesmana, Nur Suryawan, Susi Susanah

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C-Reactive Protein (CRP)/Albumin Ratio (CAR) pre-treatment as a predictive factor of radiological response after neoadjuvant chemotherapy in Locally Advanced Rectal Cancer (LARC) patients at Dr. Soetomo General Hospital, Surabaya, Indonesia
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3004>)

Fariza Hakim Rio Branco, Tomy Lesmana

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Identification of PST 10 bacterial isolate with α -hemolysis characteristic isolated from pig's tonsil
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3180>)

Hamong Suharsono, I Wayan Suardana, Rizki Kusuma Putri

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Characteristic of testicular torsion and predictors of testicular salvage: A retrospective study
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3157>)

Alfryan Janardhana, Besut Daryanto, Budi Suwarno, Arif Rahman Nurdianto

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A novel scoring system to predict postoperative mortality after colorectal cancer surgery: a retrospective cohort study
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/2988>)

Anita Hartono, Tomy Lesmana

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Correlation between Urea Creatinine Ratio (UCR) and lipid profile in COVID-19 patients
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/2945>)

Indranila Kustarini Samsuria, Ariosta Ariosta, Untung Sujianto

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The variability of temperature, rainfall, humidity and prevalence of dengue fever in Manado City
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/2722>)

Odi Roni Pinontoan, Oksfriani Jufri Sumampouw, Jansje Ticoalu, Jeini Ester Nelwan, Ester Cendrawati Musa, Joy Sekeeon

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Clinical presentation of maternal death with COVID-19 in rural tertiary care center: A retrospective-descriptive Study
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3158>)

Devita Kurniawati, Budi Prasetyo, Hanindito Pandu, Arif Rahman Nurdianto

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Aqueous Humour Malondialdehyde Level as Oxidative Stress Marker In Types Of Glaucoma
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/2599>)

Maharani Maharani, Puspita Kusuma Dewi, Riski Prihatningtias, Arief Wildan, Trilaksana Nugroho, Edward Kurnia Setiawan Limijadi, Fifin L. Rahmi

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CD44 expression as a potential favorable marker for prognosis in mucoepidermoid carcinoma of salivary gland
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/2793>)

Stella Marleen, Lisnawati Rachmadi, Diah Rini Handjari, Kusmardi Kusmardi

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TNF- α serum Level between SARS-CoV-2 Infected Pregnant women with normal pregnant women in RSUD Dr. Soetomo Surabaya
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3377>)

Margaretha Claudhya Febryanna, Manggala Pasca Wardhana, Muhammad Ilham Aldika Akbar, Arif Rahman Nurdianto

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Combination effect of methotrexate with Narrowband Ultraviolet B (NB-UVB) phototherapy in psoriasis vulgaris patients in dermatology and venerology outpatient clinic Dr. Soetomo General Academic Hospital, Surabaya, Indonesia
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3071>)

Emma Hidayati Sasmito, Iskandar Zulkarnain, Muhammad Yulianto Listiawan, Diah Mira Indramaya, Linda Astari, Budi Utomo, Afif Nurul Hidayati

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Application of Moringa Oleifera leaves extract cream inhibits paw edema in white male Wistar rat (*Rattus norvegicus*) induced by carrageenan 1%
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3384>)

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REVIEW

Human umbilical cords mesenchymal stem cells for kidney diseases
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3085>)

Dianita Halimah Harahap, Gampo Alam Irdam

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REVIEW

Medical Management of Kidney Stones: a review
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3343>)

Jody Felizio, Widi Atmoko

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REVIEW

Medical education system in Coronavirus Disease 2019 (COVID-19) pandemic: what has been changed from the past era?
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3159>)

Ida Bagus Amertha Putra Manuaba, I Gede Putu Supadmanaba, I Gusti Ayu Sri Darmayani, Dwijo Anargha Sindhughosa, Made Violin Weda Yani

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CASE REPORT

The severe adverse event in a locally anesthetized circumcision: A case report of a breath-holding spell
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3379>)

Syifa Fauziah Fadhly, Irfan Wahyudi, Gerhard Reinaldi Situmorang, Arry Rodjani

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CASE REPORT

Diagnosing and treating Patent Foramen Ovale (PFO) from various manifestations in adults: case series
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/2779>)

Todung Donald Aposan Silalahi, Christopher Surya Suwita, Rosaria Oktafiani Darmawan, Benita Rosalie

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CASE REPORT

Gastrointestinal bleeding as a life-threatening complication of liver abnormality in a Turner syndrome patient
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3259>)

CASE REPORT

Uncommon presentation of COVID-19 in ophthalmology: a case report
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3006>)

Cisca Kuswidyati, Klarissa Chrisalim, Andre

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CASE REPORT

Profuse haematochezia related to Crohn's disease: a rare case report
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3204>)

Dilly Niza Paramita, Budi Widodo, Heriyawati Heriyawati

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CASE REPORT

Turner syndrome and tuberculosis in adolescent: a case report
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3243>)

Nyoman Titamarita Trisnawan, Florencia Christina Sindhu, Peter Prayogo Hsieh, Arya Putri Ratnasari, Alberto Afrian, Ancelia Limantara, Han's Christian, Made Ratna Dewi, I Wayan Bikin Suryawan

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CASE REPORT

Fatality in a pregnant woman with COVID-19 after a cesarean section: A case report
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3301>)

Edy Parwanto, Reza Aditya Digambiro, Erdiyan Astato, Assangga Guyansyah

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CASE REPORT

Diagnostic challenges in Waldenström macroglobulinemia: a case report
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3160>)

Stella Pravita, Ugroseno Yudho Bintoro, Putu Niken Ayu Amrita

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A single-stage reconstruction on giant scrotal lymphedema: a case report
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/2907>)

David Ralph Lienhardt Ringoringo, Ramlan Nasution, Kharisma Prasetya Adhyatma

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CASE REPORT

Neonatal varicella: a rare case
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3060>)

Nanda Earlia, Wahyu Lestari, Fitri Dewi Ismida, Annisa Amalia, Aqil Yuliawan Tasrif, Mikyal Bulqiah, Dea Silvia Ramadana

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CASE REPORT

Diagnostic problems and management of pituitary gigantism leading to ischemic stroke and atrial myxoma in young adult patient: a case report
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3171>)

Nabilah, Sony Wibisono, Libriansyah, Joni Wahyuhadi, Muhammad Reza Arifianto

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CASE REPORT

Diagnostic problem on patient with tuberculous colitis mimicking Crohn's disease
(<https://www.balimedicaljournal.org/index.php/bmj/article/view/3370>)

Asep Harirohman, Herry Purbayu

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Neurotic excoriation: A case report and literature review
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Patient preferences for surgery or non-surgery for the treatment of clavus and callus at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia



Arisia Fadila¹, Iskandar Zulkarnain^{1*}, Muhammad Yulianto Listiawan¹, Budi Utomo², Maylita Sari¹, Irmadita Citrashanty¹, Bagus Haryo Kusumoputro¹

¹Department of Dermatology and Venereology, Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Academic Hospital, Universitas Airlangga Teaching Hospital, Surabaya, Indonesia;

²Department of Public Health Sciences, Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Academic Hospital, Universitas Airlangga Teaching Hospital, Surabaya, Indonesia;

*Corresponding author:

Iskandar Zulkarnain;
Department of Dermatology and Venereology, Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Academic Hospital, Universitas Airlangga Teaching Hospital, Surabaya, Indonesia;

zuljazid@yahoo.com

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ABSTRACT

Background: Clavus and callus are common hyperkeratotic lesions that can be very painful and affect the quality of life. The clinicians are faced with various factors affecting the resolution of the lesion, and no treatment has been considered ideal. Surgical has been preferable to conservative treatment but is still more likely to increase patients' desirability due to great discomfort. This study aims to evaluate the factors contributing to the resolution of callus and clavus.

Methods: Retrospective analysis was done on 25 medical records of patients who met the inclusion criteria. Factors contributing to the lesion resolution were identified and analyzed using the SPSS version 17 program.

Result: Among 25 (33.7%) patients recruited for the study, 13 were (52%) male and 12 (48%) female. The most common types of lesions were clavus (20 [80%]). In both cases, the distribution of lesion locations was mostly found in the lower extremities (20 [80%]). Excision was performed in 21 cases (84%), and 20 patients (80%) achieved resolution. Treatment modalities were found to be a factor that had a significant relation to the resolution of the lesion after receiving treatment ($p = 0.003$; Spearman test).

Conclusion: Treatment of callus and clavus has shown satisfactory results in our center. Excision was found to be the most preferred method, with 80% resolution observed during 1 month. The treatment choice was found to be significantly related to the resolution of the lesion after receiving therapy.

Keywords: Corns, hyperkeratotic, resolution, therapy.

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INTRODUCTION

Clavus and callus result from a continuous mechanical action on the skin. The incidence was reported to affect about 20% of the general population of all ages and genders.^{1,2} Morbidities of callus and clavus such as pain, gait and balance abnormality, and adverse cosmetic effects, lead to motivation for physician care visits.² Varies treatment modalities, from invasive to non-invasive approaches, are available, but little is known about factors that contribute to the resolution of the lesion after receiving therapy, such as age, gender, location of the lesion, comorbidities, or treatment modalities, thus result from the lack of strictly defined therapeutic standards for the patients.

A study on clavus and callus has never

been done before in the Tumor and Skin Surgery Division of the Dermatology and Venereology Outpatient Unit, Dr. Soetomo General Academic Hospital Surabaya. This study aimed to evaluate the contributing factors related to the resolution of callus and clavus after receiving treatment, such as age, gender, lesion type, lesion location, and its treatment in the Tumor and Skin Surgery Division of the Dermatology and Venereology Outpatient Unit, Dr. Soetomo General Academic Hospital Surabaya during January 2016-December 2020.

METHODS

This retrospective cross-sectional observational study aims to evaluate the contributing factors related to the resolution of callus and clavus after

receiving therapy. Purposive sampling was used to recruit 25 samples for the study. The inclusion criteria are subjects were patients who were clinically diagnosed with callus and clavus who were treated and observed for 1 month in the Tumor and Skin Surgery Division of the Dermatology and Venereology Outpatient Unit, Dr. Soetomo General Academic Hospital Surabaya from January 2016 - December 2019. The exclusion criteria are incomplete medical records and cases with secondary infection. The descriptive data included the clinical characteristics of gender, age, type of lesion (callus or clavus), location of the lesion, management, and the resolution of the lesion observed during 1 month after receiving therapy. Factors contributing to the resolution of the lesion were identified and analyzed using the

SPSS version 17 program. This research has been through the Ethics Committee review in Dr. Soetomo General Academic Hospital Surabaya with reference number: 0462/LOE/301.4.2/V/2021.

RESULTS

The total number of callus and clavus patients in the Tumor and Skin Surgery Division of the Dermatology and Venereology Outpatient Unit, Dr. Soetomo General Academic Hospital Surabaya, for the period January 2016-December 2019 was 74 patients, 25 (33.73%) patients finished their treatment and recruited to the study. Forty-nine (66.72%) did not complete or refused further treatment and were excluded. The most common types of lesions were clavus (20 [80%]) over callus (5 [20%]). Table 1 shows the description of callus and clavus cases that were recruited for the study. Among 25 subjects, 13 (52%) were male, and 12 (48%) were female. Age was differentiated according to WHO age classification and most subjects were adults (13 [52%]). The distribution of lesion locations in both cases was mostly found in the lower extremities (20 [80%]). Out of the 25 subjects, 21 underwent excision (84%). Out of all patients who received treatment, 20 cases (80%) were resolved.

Using the Spearman correlation test, we determined the relationship between factors related to the resolution of the lesion (type of lesion, gender, age, location of the lesion, and treatment) with the resolution after receiving treatment (Table 2). The significant relationship was defined when the p -value <0.05 . In our study, the treatment of the lesion was the only significant factor related to the resolution of the lesion after receiving treatment, with p -values was 0.003 respectively.

DISCUSSION

The callus is a non-penetrating circumscribed hyperkeratotic induced by the pressure that can act as a painful physical irritant. Callus must be differentiated from clavus, which has a penetrating subjacent structure (core) that irritates the sensory nerves from the papillary dermis, and by mechanical trauma.^{4,5} In our study, clavus dominated

most of the cases. The core of the clavus needs to be removed to provide prompt relief. On the other hand, callus is often more asymptomatic, and in most cases, simply eliminating the source of friction or pressure can make callus disappear by itself.⁴

The majority of our subject study was male, but the number was almost equal. This was not in line with previous studies that the majority of their subjects were female.^{5,6} Both sexes can have the same need to seek treatment due to symptomatic clavus or callus because pain can cause disruption of daily activities. Adults dominated both cases in our study (52%). The high level of physical activity of adults in their productive age can lead to repetitive, excessive shear forces and pressure in specific skin sites.² Some people with specific occupations, such as athletes, music instruments players, or construction workers, may develop hyperkeratotic lesions in specific skin

sites, which exposes the frictions over a long period of time.¹

The lower extremities were found to be the most sites of callus and clavus in our subjects (80%). This was in line with Gungor et al. in 2014.⁷ It is estimated that approximately 20% of the general population suffers from hyperkeratotic lesions induced by mechanical trauma, which are distributed mostly on the foot and toes.¹ The feet are designed to bear body weight when standing, walking, climbing stairs, running or jumping. These phenomena could lead to local irritation, mechanical damage to the skin of the feet, and hyperkeratosis will form as a response.² Lesions on the feet were proven to reduce the QoL when they cause pain and balance disorder, so the patient comes to seek treatment.⁸

Excision was the most preferred method in our study (90,5%). Excision is the most usual treatment performed in clinical practice for treating symptomatic callus

Table 1. Description of callus and clavus cases which were treated and controlled at least 1 time after therapy for a period of 1 month at the Tumor and Skin Surgery Division of the Dermatology and Venereology Outpatient Unit, Dr. Soetomo General Academic Hospital Surabaya during January 2016 - December 2019.

Case types	Callus (%)	Clavus (%)	Total (%)
Case distribution	5 (20.0)	20(80.0)	25(100)
Gender			
Male	3(60)	10(50)	13(52.0)
Female	2(40)	10(50)	12(48.0)
Age			
Infant	0 (0)	0 (0)	0 (0)
Children	0 (0)	2 (10.0)	2 (8.0)
Adolescent	1 (20.0)	5 (25.0)	6(24.0)
Adult	2 (40.0)	11(55.0)	13(52.0)
Elderly	2 (40.0)	2 (10.0)	2(16.0)
Lesion location			
Face	0 (0)	0 (0)	0 (0)
Upper extremity	2 (40.0)	1 (5.0)	3(12.0)
Lower extremity	3 (60.0)	17(85.0)	20(80.0)
Multiple	0 (0)	2 (10.0)	2 (8.0)
Treatment			
Excision	5 (100)	16(80)	21(84.0)
Cautery	0 (0)	0 (0)	0(0)
Cryotherapy	0 (0)	1 (5)	1(4.0)
TCA	0 (0)	2(10)	2 (8.0)
CO2 laser	0 (0)	0 (0)	0 (0)
Combination	0 (0)	1 (5)	1 (4.0)
Resolution rate			
Resolved	5 (100)	15(75)	20(80.0)
Unresolved	0 (0)	5 (25)	5(20.0)

Notes: TCA, trichloroacetic acid; CO2, carbon dioxide

Table 2. Analysis of the relationship between the type of lesion, gender, age, location of the lesion, treatment with the rate of callus and clavus resolution rate of the callus and clavus cases which were treated and controlled at least 1 time after therapy for a period of 1 month at the Tumor and Skin Surgery Division of the Dermatology and Venereology Outpatient Unit, Dr. Soetomo General Academic Hospital Surabaya during January 2016 - December 2019.

Factors	Unresolved (%) n=5		r	p
Lesion type				
Clavus	15(75.0)	5 (25.0)	0.250	0.228
Callus	5(100)	0 (0)		
Gender				
Male	12(92.3)	1 (7.7)	0.320	0.119
Female	8(66.7)	4 (33.3)		
Age				
Children	1 (50.0)	1 (50.0)	0.053	0.802
Adolescent	6 (100.0)	0 (0)		
Adult	9 (69.2)	4 (30.8)		
Elderly	4 (100.0)	0 (0)		
Lesion location				
Face	0 (0)	0 (0)	0.179	0.392
Upper extremity	2 (66.7)	1(33.3)		
Lower extremity	16(80.0)	4 (20.0)		
Multiple	2 (100.0)	0 (0)		
Treatment				
Excision	19(90.5)	2 (9.5)	0.565	0.003
Hefrycauter	0 (0)	0 (0)		
Cryotherapy	0 (0)	1 (100)		
TCA	0 (0)	2 (100)		
CO2 laser	0 (0)	0 (0)		
Combination	1 (100.0)	0 (0)		
Total	31(100)	25(100)		

and clavus due to its effectiveness, lack of complication, relatively inexpensive, and, if short term, as a preferred method of palliating the associated symptoms and serve significant reduction in pain as soon as demonstrated.^{2,5,9} Excision removes the core of the and reduces the focal pressure in the callus when it acts as a physical irritant.¹³ Hefrycauter, cryotherapy, Trichloroacetic Acid (TCA), carbon dioxide (CO₂) laser, and treatment combination usually do not resolve the lesion in one treatment and usually need repetition before the lesion is completely removed. Most of the lesions were resolved in our study (80%). This can be caused by the method performed mostly for both cases was excision that eliminates the whole lesion in one visit, regarded as resolved. Excision was reported to be able to reduce the pain significantly, focal stresses, and facilitate wound healing.^{3,5,10} Furthermore, excision is reported to have

a high recurrence rate.⁹ Previous studies found that without further intervention, a recurrence of symptomatology after callus and clavus removal by excision was normally observed within 6 to 12 weeks, but in this study, we only observed for 1 month.¹⁰ However, the remaining unresolved lesion in this study can be influenced by patients' failure to finish the treatment, compliance with treatment, failure to eliminate the trigger or other comorbid that were not reviewed in this study.

The analysis result of the relationship between treatment and resolution of the lesion was the only factor that was found significant in this study ($p = 0.003$, Spearman test). We had not found a significant relationship between the type of lesion, patient's gender, age, and location of the lesion, with a resolution of the lesion. A similar result was obtained in a previous study by Redmond et al. in 1999

that also found no significant relationship between gender of patients with resolution of callus or clavus who underwent scalpel debridement.¹⁰ Meanwhile, in a study conducted by VanHerpe and Mitchell in 1950-1960, the resolution rate of men was higher than women, and it was thought that women were more likely to use inappropriate footwear after therapy than men, which was the mechanical trigger for the recurrence of clavus or callus lesions.¹¹ Research by Redmond et al. in 1999 also found no significant relationship between age and resolution of callus and clavus, both measured by lesion resolution after excision and Visual Analog Scale (VAS).¹² Research by Gungör et al. in 2014 and Stephenson in 2016 also found no significant relationship between the location of the lesion and the resolution of the lesion. Gungör et al., in their retrospective study, found that 12 out of 17 clavus and callus patients had a complete recovery with no more clavus lesions on the hands and feet without any difference in healing in the two locations.^{7,13}

The significant relationship between treatment and the resolution rate of callus and clavus was the only factor found to be related to the resolution of the lesion in our study. Freeman, in his literature in 2002, stated that untreated callus and clavus cannot go away on their own and can become painful.¹⁴ Study by Woodburn J et al. in 2000 also reported a significant reduction in pain and plantar pressure after excision for painful plantar callosities.¹⁵ The importance of therapy in lesion resolution was also mentioned in a previous study by Lang et al. in 1994. The study compared 2 groups of clavus, one group was treated with a plaster containing 10% salicylic acid (SA), and the other group was only given a placebo-filled patch. The study reported that there was a significant difference in healing between the two groups. The group treated with plaster containing salicylic acid showed more effective healing than placebo.¹⁶ This may indicate the importance of treatment on clavus and callus healing.

The non-surgical approach is replacing surgical in treating clavus and callus. However, most of our study subjects preferred excision and experienced resolution within 1 month and significant

pain reduction thereafter. Excision has been reported to be able to provide prompt pain relief and faster wound healing. Firoz BF et al. in 2010 in their study had reported data indicating that linear closures produced less pain than flap closures, although these data did not reach statistical significance.¹⁷ Interestingly, a great number of patients in our center did not complete or refused further treatment. Avoiding surgery may have attendant disadvantages, including longer pain experience, slower lesion reduction, higher risk of infection, frequent failures, lack of adherence to conventional treatments, and treatment resistance, especially if clavus or callus, due to repeated friction and forces, forms fissure, local tissue hypoxia, bacterial colonization/infection, repeated ischemia-reperfusion injury, and cellular and systemic changes.¹⁸ As one of the goals of the clavus and callus treatment is to provide symptomatic relief. Excision can be offered to patients who expect an immediate effect. However, given the fact that cutaneous surgeries have outstanding safety profiles, making an evaluation of the patient in order to consider whether a surgery or non-surgery approach will be chosen is the first step to making the decision. Patient comorbidities such as the risk of bleeding, history of atrial fibrillation, pulmonary embolism, myocardial infarction, cerebrovascular accidents, deep venous thrombosis, and those post stent placement are a risk to be considered in order to prevent uncertainty regarding the risk of the surgery, poor satisfaction, and complication.¹⁹

The effectiveness of excision in managing painful callus and clavus also comes with the fact that most patient has their own perception of sharp scalpel debridement, especially regarding pain. Therefore, pain management pre-operatively, during, and following surgery is one of our priorities. Pain control can help speed the recovery and reduce the risk of developing certain complications after surgery. The local anesthetic injection is reported to be one of the most painful parts of minor surgery. Limiting discomfort during injection of local anesthetic before surgery can be achieved through choosing the type of local anesthetic, solution pH, solution temperature, needle size,

injection technique, consider using topical anesthetic cream, ice cooling, botox, and the distraction methods.²⁰ The technique of anesthesia performed in our clinic according to the availability of our setting are by using lidocaine solution, a small gauge syringe, and needle insertion at a 90° angle, pulling the needle before the administration of the solution, and slower injection rate in order to lower the pain experience. Lidocaine is preferred rather than lidocaine premixed with epinephrine because the former has closer pH to physiologic level, thus helping decrease injection pain. Minimizing pain in lidocaine premixed with epinephrine can be achieved by buffering the solution, yet it is not available in our setting.²⁰ We use a smaller needle diameter, preferably 30 gauges or smaller, which is advantageous as there is a direct relationship between needle diameter and insertion pain.²¹ The insertion method, we do needle insertion at 90° rather than 45° angle to limit the transection of the dermis and dermal nerve to avoid pain.^{22,23} Stabilize the needle holding to reduce needle movement, injection of the needle to subcutaneous fat, pull the needle, then pause after injecting 0,5 ml of lidocaine, and then continue with slower the rate injection of lidocaine agent to help with the pain because it gives time for the agents to diffuse and block the nerve transduction of the stimulated fibers.²⁰

Excision is performed in sterile technique, elliptical cut 0,5 cm from the edge of the lesion to prevent wound tension and avoid secondary infection that can delay wound healing and pain during recovery. We also consider acute post-surgical pain, especially in patients with a painful callus or clavus lesion who previously had experienced pain. Paracetamol is a dose of 500 mg 3 times daily given to provide significant pain reduction for mild to moderate pain over 4-6 hours. Acetaminophen in doses of 500 mg to 1 gram is more recommended, but it was unavailable in our setting.

The physician cannot always predict a patient's desires and thus should not assume that patients would reject surgical treatment for their lesion. Preoperative education about the procedure of the treatment, pain physiology, and pain

management strategies may be helpful to reduce the patient's anxiety and impact the patient's treatment decision. We hypothesized that pain also might predict a patient's therapy choice. Physicians and patients in our study had chosen surgery more frequently, aside from its invasive procedure, and the majority had resolved with no complaint of pain during recovery observed during 1 month. This finding suggests that, first, medical decision-making is linked to the patient's perception of the procedure and, second, the amount of pain. If surgical for clavus and callus is worth the risk, then further research can be directed to the management of pain and surgical method for reducing the pain during the procedure. Patients are most willing to choose surgery if short-term pain reduction effects can be gained as soon as the procedure and if they experience a less painful surgical procedure.

There are several limitations to our study. The first limitation was our study is a cross-sectional design that is not the best way to examine a causal relationship. Our second limitation was being a retrospective design, and we could not obtain exact information about patients' clinical data and previous history. Thus, we could not analyze the relationship between lesion size, lesion trigger, and patient's comorbid. The third limitation was there are still no resolution criteria for callus and clavus. Further investigations with prospective design might overcome these limitations. In conclusion, treatment was the only factor that contributed to the resolution of the lesion, which was observed during 1 month after therapy. To the best of our knowledge, this is the first clinical study to evaluate contributing factors to the resolution of the callus and clavus after treatment. Hence, further research with a longer period might focus on the other factor that has not been evaluated in this study that might influence callus and clavus resolution after treatment.

CONCLUSION

The treatment outcome of clavus and callus in our clinic had shown satisfactory results, with 80% resolution. The treatment modality is the only factor that was significantly related to the patient's recovery rate. In this study, excision for

treating clavus and callus also served quick symptomatic relief and gave resolution we observed during 1 month. Further studies with standard resolution criteria of clavus and callus lesion, larger sample sizes, and a longer period of observation are needed to achieve more optimal study results.

The main goal of the management of clavus and callus is to provide symptomatic relief, determine mechanical etiology, conservative treatment, and consider surgery if conservative treatment fails.²³ For instance, given that patients presenting with a painful callus or clavus who expect immediate relief can be offered surgical intervention. Conversely, the non-invasive method is chosen for patients that are not preferable to surgery, have a less painful lesion, or have comorbid that risk the wound healing after surgery.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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ETHICAL CLEARANCE

This research has been through the Ethics Committee review in Dr. Soetomo General Academic Hospital Surabaya with reference number: 0462/LOE/301.4.2/V/2021.

AUTHOR CONTRIBUTION

All authors contributed to the study, including conceptual framework, design, data collection, and data analysis to report study results for publication.

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