

بسم الله الرحمن الرحيم

 $\infty\infty\infty$

تم رفع هذه الرسالة بواسطة / مني مغربي أحمد

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

AIN SHAMS UNIVERSITY

1992

1992

ملاحظات: لا يوجد



THE ROLE OF INTRA-ARTICULAR INJECTION OF AUTOLOGOUS PLATELET RICH PLASMA VERSUS CORTICOSTEROIDS IN TREATMENT OF SYNOVITIS IN LUMBAR FACET JOINT DISEASE

Thesis

Submitted for Partial Fulfillment of MD Degree in Physical Medicine, Rehabilitation and Rheumatology

Presented by

Shahdan Yousry Abdelmonen Mohamed Kotb (M.B.BCH, M.Sc)

Supervised by

Prof. Dr. Nahed Mounir Sherif

Professor of Physical Medicine, Rheumatology and Rehabilitation Faculty of Medicine, Ain Shams University

Prof. Dr. Hala Abdulhady Saleh

Professor of Physical Medicine, Rheumatology and Rehabilitation Faculty of Medicine, Ain Shams University

Prof. Dr. Sahar Fathi Ahmed

Professor of Physical Medicine, Rheumatology and Rehabilitation Faculty of Medicine, Ain Shams University

Prof. Dr. Hossam Moussa Sakr

Professor of Radiodiagnosis
Faculty of Medicine, Ain Shams University

Dr. Mohamed Osman Taeimah

Lecturer of Anesthesiology, Intensive care and Pain management Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain Shams University
2022



دراسة دور الحقن المفصلي بالبلازما الغنية بالصفائح الدموية بالمقارنة مع الحقن بالكورتيكوستيرويد في علاج الالتهاب الزلالي في مرض المفاصل الوجيهية القطنية رسالة

توطئة للحصول علي درجة الدكتوراة في الطب الطبيعي، الروماتيزم والتأهيل مقدمة من

الطبيبة / شهدان يسرى عبدالمنعم محمد قطب

ماجستير الطب الطبيعي، التأهيل والروماتيزم - جامعة عين شمس تحت إشراف

أد/ ناهد منير شريف

أستاذ الطب الطبيعي، الروماتيزم والتأهيل كلية الطب- جامعة عين شمس

أد/ هالة عبد الهادي صالح

أستاذ الطب الطبيعي، الروماتيزم والتأهيل كلية الطب- جامعة عين شمس

أد. سحر فتحي أحمد

أستاذ الطب الطبيعي، الروماتيزم والتأهيل كلية الطب- جامعة عين شمس

أد. حسام موسى صقر

أستاذ الأشعة التشخيصية كلية الطب - جامعة عين شمس

د. محمد عثمان طعيمة

مدرس التخدير و الرعاية المركزة وعلاج الألم كلية الطب - جامعة عين شمس كلية الطب كلية الطب جامعة عين شمس جامعة عين شمس ٢٠٢٢



سورة البقرة الآية: ٣٢



First and foremost thanks to ALLAH, the Most Merciful.

I wish to express my deep appreciation to **Prof. Dr. Nahed Mounir Sherif**, Professor of Physical Medicine, Rheumatology and Rehabilitation, Ain Shams University, for devoting much of her time and effort for planning and supervision of this study.

Great thanks and gratitude to **Prof. Dr. Hala Abdulhady Saleh**, Professor of Physical Medicine, Rheumatology and Rehabilitation, Ain Shams University, for her close supervision, valuable instructions, continuous help, patience, advices and guidance.

I wish also to express my gratitude to **Prof. Dr. Sahar Fathi Ahmed,** Professor of Physical Medicine, Rheumatology and Rehabilitation, Ain Shams University, for her kind supervision, indispensable advice and great help in this work.

My sincere appreciation to **Prof. Dr. Hossam Moussa Sakr,** Professor of Radiodiagnosis, Ain Shams University, for his highly valuable work in this research, it was a great honor working with him.

I would like to extend my sincere thanks to **Dr. Mohamed Osman Taeimah**, Lecturer of Anesthesiology, Intensive care and Pain management,
Ain Shams University, for his generosity in educating and sharing knowledge
and for his continuous unconditioned support.

Last and not least, I want to thank all my family, without them, this work could not have been completed.

CONTENTS

Ti	tle	Page
•	List of Abbreviations	I
•	List of Tables	III
•	List of Figures	VIII
•	Introduction	1
•	Aim of the work	7
•	Review of literature	
	Chapter (1): The Facet Joint	8
	Chapter (2): Lumbar Facet Disease	28
	Chapter (3): Imaging in Facet Joint Disease	54
	Chapter (4): Treatment of Lumbar Facet Disease	73
	Chapter (5): Platelet Rich Plasma (PRP)	97
•	Patients and Methods	107
•	Results	124
•	Discussion	185
•	Conclusion	201
•	Recommendations	202
•	Summary	203
•	References	208
•	Appendix	245
•	الملخص العربي	

LIST OF ABBREVIATIONS

Abb.	Full-Term
AP	: Antero-posterior
AS	: Ankylosing Spondylitis
	: Basic fibroblast growth factor
CBT	: Cognitive behavioral therapy
	: Cryoneurolysis
	: Calcium Pyrophosphate Deposition Disease
	: Conventional Radiography
	: Corticosteroids
CT	: Computed Topography
	: Connective tissue growth factor
	: Epidermal growth factor
	: Extension
FCL	: Facet capsular ligaments
FFI	: Facet fluid index
FGF	: Fibroblast growth factor
FJ	: Facet Joint
FJI	: Facet Joint injection
GAG	: Glycosaminoglycans
GCSF	: Granulocyte colony-stimulating growth factor
GF	: Growth factors
GRO-a	: Growth-related oncogene-a
HA	: Hyaluronic acid
IAP	: Inferior articular process
IF	: Interferential current
IFN-c	: Interferon-c
IGF-1	: Insulin like growth factor 1
	: Interleukin
kMRI	: Kinematic magnetic resonance imaging
LA	: Local anesthesia
LBP	: Low back pain
mAbs	: Monoclonal Antibodies
MBB	: Medial branch block
MRI	: Magnetic resonance imaging
MSC	: Mesenchymal signaling cells
	: Nerve growth factors

ı

LIST OF ABBREVIATIONS (CONTINUED)

Abb.	Full-Term
NSAIDs	: Non-steroidal anti-inflammatory drugs
OA	: Osteoarthritis
	: Oswestry disability Index
PDGF	: Platelet-derived growth factor
PRF	: Platelet-rich fibrin
PRP	: Platelet rich plasma
RF	: Radiofrequency
RFA	: Radiofrequency ablation
	: Roland Morris Questionnaire
	: Range of motion
	: Superior articular process
	: Soluble intercellular adhesion molecule-1
SPECT	: Single Photon Emission Computed
	Tomography
TENS	: Transcutaneous electric stimulation
TGF- β	: Transforming growth factor beta
TNF-a	: Tumor necrosis factor-alpha
	: Visual analogue scale
VEGF	: Vascular endothelial growth factor

LIST OF TABLES

Table No	Subjects Page
Table (1):	CT grade criteria for facet degeneration 59
Table (2):	A grading system for facet synovitis as seen by MR fat-suppression65
Table (3):	PRP role in wound healing, orthopedic and sports medicine (Isabel and Nicola, 2018)102
Table (4):	Demographic data of the patients included in the study
Table (5):	Statistical comparative analysis between the two groups as regards their demographic data126
Table (6):	Comparison between the number of joints showing tenderness on palpation before the intervention between both groups
Table (7):	Comparison between the two groups as regards maximum active lumbar extension ROM before the intervention (as measured by a goniometer)
Table (8):	Comparison between the two groups as regards pain score (VAS) before the intervention
Table (9):	Comparison between the two groups as regards functional disability questionnaires scores; RMQ and ODI before the intervention
Table (10):	Summative statistical analysis between the two groups before the intervention as regards number of joints showing MRI positive findings for synovitis and their grading

Table No	Subjects	Page
Table (11):	Comparison between MRI findings between both groups before the intervention a regards number of joints showing synovitiand their grading.	s s
Table (12):	Comparing number of lumbar facet joint showing tenderness on palpation before an after the intervention in Group (I) which received PRP	d h
Table (13):	Comparison between the degree of maximum extension ROM as measured by the goniometer before and after the intervention in Group (I) receiving PRP	e n
Table (14):	Comparison between visual analogue scor for low back pain before and after the intervention in Group (I) receiving PRP	e
Table (15):	Comparison between Functional Assessment Questionnaire scores before and after the intervention in Group (I) receiving PRP	e
Table (16):	Comparison between total MRI lumbar face joints synovitis grading at all lumbar level before and after the intervention in Group (I receiving PRP	s ()
Table (17):	Comparison between MRI lumbar face joints synovitis grading before and after the intervention in Group (I) receiving PRP at each lumbar level	e .t
Table (18):	Comparing number of lumbar facet joint showing tenderness on palpation before an after the intervention in Group (II) which received Corticosteroids	d h

Table No	Subjects F	Page
Table (19):	Comparison between the degree of maximum extension ROM as measured by the goniometer before and after the intervention in Group (II) receiving Corticosteroids	152
Table (20):	Comparison between visual analogue score for low back pain before and after the intervention in in Group (II) receiving Corticosteroids	154
Table (21):	Comparison between Functional Assessment Questionnaire scores before and after the intervention in roup (II) receiving corticosteroids.	156
Table (22):	Comparison between total MRI lumbar facet joints synovitis grading at all lumbar levels before and after the intervention in Group (II) receiving coricosteroids	158
Table (23):	Comparison between MRI lumbar facet joints synovitis grading before and after the intervention in Group (II) receiving corticosteroids.	161
Table (24):	Comparison between the number of joints showing tenderness on palpation after the intervention between both groups	163
Table (25):	Comparison between the two groups as regards maximum lumbar extension ROM after the intervention	165
Table (26):	Comparison between the two groups as regards visual analogue score (VAS) for low back pain after the intervention	165

Table No	Subjects	Page
Table (27):	Comparison between the two groups a regards functional disability questionnaire scores; RMQ and ODI after the intervention.	s
Table (28):	Summative statistical analysis between the two groups after the intervention as regard MRI positive findings for synovitis and their grading	s r
Table (29):	Comparison between MRI findings between both groups after the intervention as regard number of joints showing synovitis and their grading	s r
Table (30):	Showing correlation between participants age and disease duration with number of lumbar facet joints showing tenderness of palpation, maximum lumbar active extension ROM, VAS, RMQ score and ODI score	f n n
Table (31):	Statistical correlations between number of tender joints, extension ROM, VAS, RMC and ODI before the intervention	Q
Table (32):	Statistical correlations between number of tender joints on palpation, lumbar extension ROM, VAS, RMQ and ODI after the intervention.	n e
Table (33):	The participants and the documented number of tender joints, maximum active lumbar extension and scores of VAS, RMQ and ODI.	r d
Table (34):	Showing statistical relation between MR grading of synovitis at different joint level and ODI after the intervention	S

ÆList of Table

Table No	Subjects	Page
Table (35):	Performance of tenderness on palpation is detecting lumbar facet joint synovitis on MR	
	imaging at the same levels	183

LIST OF FIGURES

Figure No	Subjects	Page
Figure (1):	The lumbar facet joint between superior articular process from the inferior vertebral level of the joint and the inferior articular process from the superior vertebral level	l r
Figure (2):	MRI image of the facet joint. (arrows) positioned symmetrically relative to the mid-sagittal plane in the postero-lateral regions of the spine	- f
Figure (3):	Transverse section of the facet joint at L2/3 level. SP: superior articular process of L3, IP inferior articular process, SP: superior articular process LF: ligamentum flavum, C articular cartilage, S: synovial lining	: r :
Figure (4):	Showing the paired lumbar facet joint and the intervertebral disc make up the 'three-join complex'. a Sagittal view of a lumbar disc-facet unit b Axial view of a lumbar disc-facet unit	t - -
Figure (5):	The lumbar Facet capsular ligament	16
Figure (6):	The lumbar facet joint articular cavity as seen on MRI; red arrow: FJ cavity, White arrow synovial recesses	:
Figure (7):	Movements of the lumbar spine: (A) side (lateral) flexion; (B) flexion/ extension; (C) rotation)
Figure (8):	Flexion (A) and extension (B) in the lumbar spine	
Figure (9):	Right lateral oblique view of the lumbar vertebral bodies and the dorsal rami media branches.	1

LIST OF FIGURES (CONTINUED)

Figure No	Subjects	Page
Figure (10):	Axial MRI noting assessment of facet join angulation.	
Figure (11):	Plain X-Ray image lateral view showing spondylolisthesis level L4-5 (arrow)	
Figure (12):	Illustration of distribution pattern related to facet joint pain	
Figure (13):	MRI imaging of some of the common differential diagnosis of lumbar FJ disease	
Figure (14):	A: multiple-level spondylolisthesis of L2 (Grade-I posterolithesis) and L4 (Grade-anteriolithesis); B: spondylolisthesis of L2 (Grade-I posterolithesis)	I 2
Figure (15):	Showing the scottie dog sign of the FJ or oblique view radiograph	
Figure (16):	Conventional radiography of the lumbar spine.	
Figure (17):	Representative image of CT grading of F. degeneration	
Figure (18):	MRI imaging of facet joints: (a, b): axial and sagittal T2 STIR views and (c) T2 sagittal view showing Active synovial inflammation and intra articular edema	l 1
Figure (19):	Classification of facet joint osteoarthritisusing Pathria grading scale . a Grade II. b Grade II. c Grade III. d Grade IV)
Figure (20):	MRI Grading of facet synovitis: fat-saturated T2-weighted imaging. (a) Grade 1 (b) Grade 2 (c) Grade 3 (d) Grade 4	e