

AN AUDIT OF TRAUMA INTERCOSTAL DRAINS AT TEMBISA HOSPITAL

M R Nkomo

Student no. 8702222p

04 August 2014

A research report submitted to the faculty of Health Sciences, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master in Science in Medicine (Emergency Medicine).

DECLARATION

I student number

.....hereby declare the following:

- I am aware that plagiarism (the use someone else's work without their permission and/or without acknowledging the original source) is wrong
- I confirm that the work submitted is my own unaided work
- I have followed the required conventions in referencing the thoughts and ideas of others
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing

Signed:.....

Date:.....

DEDICATION

This study is dedicated to my late family members:

- Father, Don Arthur Phangindawo, Mntungwa, Golela, Yengwayo!
- Mother, Thokozile Thalitha “MaMnguni”
- Younger brother Sonwabo Andile Nkomo

ABSTRACT

Background: Chest trauma is a common Emergency Department presentation. Most patients are treated by the Advanced Trauma and Life Support (ATLS™) principles and the insertion of an intercostal drain (ICD) where indicated. However, the procedure has complications.

Aim: The aim of this research project was to study trauma ICDs at Tembisa Hospital.

Objectives: The objectives were to (a) obtain demographics, (b) determine complications, (c) compare the complications between those of Tembisa Hospital and Tygerberg Hospital (d) determine whether mechanism of injury, indication for the ICD, time of day, trauma team, ICD duration, length of hospital stay and the patient's age were risk factors for developing complications.

Results: (a) Of the 251 patients and 285 ICDs, 244 (97.2%) were males. The ages varied between 14 and 61 years (28.77 mean). ICD duration ranged from 1 to 35 days (5 mean). Length of hospital stay was between 1 to 68 days (6.32 mean). Stab wounds were the most frequent type of injury (81.6%). Penetrating injuries accounted for 94% of all injuries. Indications for ICD insertion were 89 (34%), 86 (32.8%) and 81 (30.9%) for haemopneumothoraces, haemothoraces and pneumothoraces respectively. (b) There were 64 complications (22.5%) among 49 patients (19.5%). (c) Both Tembisa Hospital and Tygerberg Hospital had "loose" ICDs and malpositions among their commonest

complications. (d) Only ICD duration and length of hospital stay were risk factors for developing complications at Tembisa Hospital.

Conclusion: Doctors should be taught proper ICD insertion and fixation techniques. ICD duration should be minimized.

ACKNOWLEDGEMENTS

- To my supervisor, Prof. E. Kramer, of the Family Medicine Department, Emergency Medicine Division of the University of the Witwatersrand for repeatedly correcting the research protocol and this research report
- To the statistician, Prof. S. Manda of the South African Medical Research Council in Pretoria
- To the CEO of Tembisa Hospital, Dr S. Mfenyana, for granting me permission to do the study in that institution
- To Miss Simangele Sibeko, the Tembisa Hospital's ward 17 clerk, who helped with the retrieval of files from the Records Department
- To Abbey Phutiagae for taking pictures of ICD suturing techniques

TABLE OF CONTENTS

	Topic	Page
Index	Declaration	ii
	Dedication	lii
	Abstract	iv
	Acknowledgements	vi
	Table of contents	vii
	List of tables	x
	List of figures	xi
Chapter 1	Introduction	1
	1.1 Background	1
	1.2 Purpose	5
	1.3 Aim	5
	1.4 Objectives	5
	1.5 The structure of the report	6
	1.6 Summary	6
Chapter 2	Literature review	7
	2.0 Introduction	7
	2.1Literature review	7
	2.1.1 Trauma ICD indications	7
	2.1.2 Use of a trocar	9
	2.1.3 ICD drainage systems	10
	2.1.4 Use of prophylactic antibiotics	11
	2.1.5 Fixation of the ICD to the skin	14
	2.1.6 ICD complications	19
	2.1.7 Who should insert the ICD?	25
	2.2 Summary	26
	Chapter 3	Methodology
3.0 Introduction		27
3.1 Ethics		27
3.2 Design		27
3.3 Population		28
3.4 Inclusion criteria		28
3.5 Exclusion criteria		28

	3.6 Data collection	29
	3.7 Data analysis	31
	3.8 Limitation	31
	3.9 Summary	31
Chapter 4	Results	33
	4.0 Introduction	33
	4.1 Descriptive data	33
	4.1.1 Number of patients	33
	4.1.2 Number of ICDs	34
	4.1.3 Gender	34
	4.1.4 Age	34
	4.1.5 Duration of the ICD	34
	4.1.6 Length of hospital stay	35
	4.1.7 Type of injury	35
	4.1.8 Mechanism of injury	35
	4.1.9 Indication for ICD insertion	36
	4.1.10 Trauma teams	36
	4.1.11 Time of day	36
	4.1.12 Patient outcomes	37
	4.2.1 Intercostal drain complications	37
	4.2.2 Complication rate	39
	4.3 Risk factors for developing trauma ICD complications	41
	4.4 Summary	41
Chapter 5	Discussion	43
	5.0 Introduction	43
	5.1 Demographics	43
	5.2 Complications of trauma ICDs	44
	5.2.1 Empyema	44
	5.2.2 The slipping out of the ICD	46
	5.2.3 Non-functional and malpositioned ICDs	47
	5.2.4 Other ICD complications	49
	5.3 Complication rate	49
	5.4 Comparison between the Tembisa Hospital and Tygerberg Hospital studies	52
	5.5 Risk factors for developing complications	57
	5.6 Summary	60

Chapter 6	Conclusion	61
	6.0 Introduction	61
	6.1 Conclusion	62
	6.2 Recommendations	62
	6.3 Sources of bias	65
	6.4 Summary	67
Chapter 7	References	69
Appendices	Ethics approval	
	Tembisa Hospital's CEO approval letter	
	Data sheet	
	Statistician's letter	

LIST OF TABLES

Table number	Title of table	Page number
4.1	Trauma ICD patients	33
4.2	Trauma ICDs	34
4.3	Type of injury	35
4.4	Mechanism of injury	35
4.5	Complications of trauma ICDs	38
4.6	Complication rates	39
4.7	Category-specific trauma ICD complications	40
4.8	Risk factors	41
5.1	Differences between Tembisa and Tygerberg hospitals' audits	57

LIST OF FIGURES

Figure number	Description	Page number
2.1	Method 1 of securing an intercostal drain	15
2.2	Method 2 of securing an intercostal drain	16
2.3	Method 3 of securing an intercostal drain	17
2.4	Method 4 of securing an intercostal drain	18
4.1	Trauma ICD patient gender	34
4.2	Indications for trauma ICD insertion	36
4.3	Trauma ICD teams	36
4.4	Time of day when trauma ICDs were inserted	37
4.5	Trauma ICDs patient outcomes	37