ORIGINAL ARTICLE

EFFICACY OF PYODINE AND HYDROCOLLOID DRESSING IN DIABETIC FOOT INFECTIONS

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ABSTRACT

Objectives: To determine the efficacy of pyodine solution and hydrocolloid gel in the management of diabetic foot ulcers.

Material and methods: This descriptive study was carried out over 149 patients. After written informed consent, all the patients were treated with I/V antibiotics according to culture and sensitivity reports and were then followed by oral antibiotics for a period of 2 weeks. Multiple dressings with pyodine solution and gel were performed till the complete healing of wound after one month time.

Results: This study included 149 patients of either gender. Average age was 50.64 years+9.24SD. Male to female ratio was 2.14:1.97(65.36%) patients showed efficacy of pyodine solution and hydrocolloid gel in diabetic foot ulcer.

Conclusion: The efficacy of pyodine solution and hydrocolloid gel in the management of diabetic foot ulcer is high. We recommend the use of pyodine solution and hydrocolloid gel in the treatment of diabetic foot ulcers in developing countries.

Key words: Wound healing, diabetic foot, ulcer, hydrocolloid gel, Efficacy, Pyodine.

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INTRODUCTION

Diabetic foot is a common complication of diabetes with prolonged morbidity and sometimes can result in amputation; a demoralizing compication[1]. Diabetic foot is one of the preventable and curable complications of diabetes. In diabetics, incidence of foot ulcers accounts for 25%[2]. Diabetes carries with itself a host of complications which includes diabetic neuropathy, micro vascular complication, Charcot's arthropathy, osteomyelitis, retinopathy, and autonomic dysfunction[4].

Diabetic foot is the most feared complication thatcan undergo an amputation than rest of the population. The link to high morbidity and mortality of diabetic foot is strong due to the fact that it often leads to amputations[5]. A lot of efforts being put to optimize diabetics and deal with its complications in surgical and orthopedic department for foot care, it is on the rise in the United states[6]. Diabetic foot ulcers profoundly impairs the living of one being, worst for patients who need amputation. Early recognition and proper management of risk factors may prevent amputations[7].Optimum glycemic control with timely assessment and diagnosis of diabetic foot ulcer will greatly curtail number of diabetic foots in the west as well as rest of world as diabetes is associated with high human amputees[8]. Diabetic foot ulcers respond best to frequent saline wash and wet moist dressings, wet to dry dressing technique. Furthermore, a multidisciplinary approach has proven to be effective in reducing the amputation rate, with comparable healing rates of as high as 65-80 %. Also vigilant follow up with standard care should be the mainstay of treatment, as this is a lifelong illness[9].

Gula et al in his study stated male predominance with 65% ratio in total of 200 patients that presented with diabetic foot ulcer, the average being 53.40 years of age[10]. A report from WHO stated that Pakistan had 4.3 million people affected with diabetic foot, ranked 8th in 1995 while it is going to move to 4th place by the year 2025 with a total number of 14.3 million people being the victims. For the current rate of 125 amputations carried

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out per week, up to 80 % of these are potentially preventable[12]. The rationale of this study is to assess efficacy of pyodine solution and hydrocolloid gel in diabetic foot ulcer in terms of wound healing. The mass population is unaware of the care of diabetic foot without having basic knowledge of its development, hence marked complications in the form of ulcers, amputations and morbidity. They lose their limbs and become disabled. It is of utmost importance that any foot ulceration should be detect early in the course of disease and with regular checkup by a GP who is vigilant for this complication of diabetes. This study will help us to identify local statistics regarding knowledge and practices of foot care and identify key lapses in diabetic foot care management.

MATERIAL AND METHODS

This prospective observational study was conducted in Department of Surgery, Khyber Teaching Hospital, Peshawar after approval from the ethical board and research committee of the of the Hospital from April 3, 2015 to October 4, 2015 over 149 patients collected by non-probability sampling method. All admitted patients meeting the inclusion criteria which included males and females aged 35-65 years having type II diabetes Mellitus for the last 5 years or more receiving either oral anti diabetic drugs or insulin, were counted in the study. All the patients after history and clinical examination were investigated by CBC, Blood Sugar level. Blood sugar was controlled mostly by insulin injections. Patients with fasting glucose > 7mmol/L (126mg/dl) and random >11.1 mmol/L (200mg/dl) were considered diabetic. All the patients were treated with I/V antibiotics according to culture and sensitivity reports and were then followed by oral antibiotics for a period of 2 weeks. Multiple dressings with pyodine solution and gel or hydrocolloid were performed till the complete healing of the wound after one month time. The appearance of healthy granulation tissue at the wound site was considered as healing of wound within one month. All those diabetic patients who have unilateral or bilateral foot amputation and immune compromise were excluded from the study.

Strict exclusion criteria were followed to control confounders and bias in study results. Data were analyzed by using SPSS version 20 on computer. Standard Deviation was computed for numerical variables like age and diabetes duration. Frequency and percentages were computed for categorical variables like gender, Efficacy. Efficacy were stratified among age gender duration of diabetes to control effect modifier post stratification were done through chi-square test keeping P-value < 0.05 were signification All the results were presented in the form of tables and charts.

RESULTS

A total of 149 patients of either gender presenting with diabetes mellitus for the last 5 years were included in the study. There were 47 (31.84%) females and 102(68.16%) were males. Male to female ratio was 2.14:1.

Average age of the patients was 51.34 years+10.24SD with range 30-65 years. Patient's age was divided in four categories, out of which most common age group for type II diabetes mellitus disease was 41-50 years of age. There were 28(19%) patients were of the age less than or equal to 40 years. Fifty Six (37.4%) patients were in the age range of 41-50 years, 34 (22.9%) were of age range 51-60 years and 31(20.7%) presented at more than 60 years of age. Average duration of diabetes was 4.08 years+1.55SD. Out of 149 diabetic patients, 97(65.36%) patients showed efficacy of pyodine solution and hydrocolloid gel in diabetic foot ulcer while52(34.64%) patients hadno efficacy.

Table 1: Age wise distribution of efficacy among patients with diabetes foot ulcer.

		Efficacy		Total	P-value
		Yes	No		
Age (in years)	<= 40.00	22	6	28	0.428
		78.5%	21.5%	100.0%	
	41.00 - 50.00	37	19	56	
		66.1%	33.9%	100.0%	
	51.00 - 60.00	21	13	34	
		61.8%	38.2%	100.0%	
	61.00+	19	12	31	
		61.2%	38.8%	100.0%	
Total		97	52	149	
		65.1%	34.9%	100.0%	

Table 2: Gender and duration of diabetes wise distribution of efficacy among patients with diabetes foot ulcer.

		Efficacy		P-value
		Yes	No	
Gender	Male	66	36	0.470
		64.7%	35.3%	
	Female	31	16	
		66%	34%	
Duration of Diabetes (in years)	<= 5.00	85	42	0.134
		66.9%	33.1%	
	6.00+	12	10	
		54.5%	45.5%	

DISCUSSION

Among diabetics, 15% of the subjects can develop diabetic foot ulcer and among those 14 to 24% of the subjects have a resultant amputation because of the ulcer disease[13]. Wet /moist dressings provides a moisture rich atmosphere for optimum wound healing and it is of imperative use that low cost modalities of treatments be identified as the financial burden of diabetes as its complications are on the rise.

Over the time since the first concept of healing and medicine, multi modalities and treatment options have been devised which included solutions, ointments and creams for wound healing[14]. Pyodine is unique compound first discovered by Davies in 1811 and is since in use to treat infected wounds dressing. It is a dark purple compound which easily dissolves in alcohol and potassium iodide[15].

A study reported mean age of 50.64 years+9.24 SD, with a range of 35-65 years, an age range lesser than the other publication reports[13]. Due to male dominant society, gender ratio was 2.14:1, males being more than females[16,17].

In a study conducted by Gul A et al, subjects of 200 in total suffered from diabetic foot ulcers and the gender ratio was 65% to 35% males being more with a 53.40 years of mean age[18]. In our study, males were 68.16% and females were 31.84% with average age 51.34years which is quite comparable to our study.

Multiple factors such as diabetic mellitus, hypertension and venous disease greatly impairs the healing of wound reported by Lazarus et al[16].

A significant number of amputations in diabetic patients can be prevented by patient education, foot care and increased awareness on the part of diabetes care teams of effective strategies in ulcer,however, are amenable to successful conservative limb salvage treatment; a number of patients require amputation. Makhdoom A et al in the study of 100 patients with diabetic foot reported 48% total amputation rate[19]. In a series by Shabbir E et al [20], out of 94 diabetic patients, 39 (43.8%) patients underwent amputation, 24 major and 15 minor[20].

Amputation rate in our study is low as compared to other studies. Multidisciplinary approach and vigilant foot care with patient education can reduce the rate of diabetic foot related amputation rate from 50 to 70 %.21Eneroth et al in his study showed that long standing diabetic foot ulcers with marked depth and osteomyelitis could be healed completely as much as 39% of the study group of 233, not resulting in amputation, and the initial management should include rigorous soft tissue debridement[22].

This course of treatment was our initial management protocol with equivocal outcomes as those of Eneroth et al. 97 out of 149 patients responded to our intervention while 52 did not respond and needed minor or major amputations later on[23]. In our study, the patients with Wagner's grade I and II were cured completely; grade iii patients treated by aggressive surgical resection with good results, whereas in grade iv and v patients conservative treatment failed and most of them ended up with major amputation.

LIMITATIONS

The study being carried out in a single setup makes it a limited data resultant study, hence a more comprehensive study would be the need of the hour to assess whether medicated dressings are beneficial in long term prevention of diabetic foot ulcers.

CONCLUSION

Use of pyodine significantly affects the rate of wound healing with optimal outcomes and when the same drug was used with hydrogel form dressing it was much more beneficial.

RECOMMNEDATIONS

Diabetic foot is a multidisciplinary disease which requires vigilant and rigorous attention to the wound care in form of medicated dressings with optimum glycemic control and with surgical management when needed.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Naeem M: Concept, Drafting manuscript.

Saeed T: Data acquisition, Design.

Mabood W: Design, Data acquisition, Drafting, Proof reading.

Ahmad M: Proof Reading.

Waheed R: Data Collection, Bibliography.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.