

Effect of QCC Activities of Reducing the Occurrence Rate of Adverse Reaction of Subcutaneous Injection with Low Molecular Heparin

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Author's Contribution

All the authors contributed significantly to the research that resulted in the submitted manuscript.

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ABSTRACT

Objective: The application effect of QCC of reducing the occurrence rate of adverse reaction of subcutaneous injection with low molecular heparin.

Methods: Selected 278 cases of patients of post operation requiring subcutaneous injection with low molecular heparin to prevent from venous thromboembolism in Urology Department of the First Affiliated Hospital of Zhengzhou University from March 2015 to October 2015. Make the activity theme as reducing the occurrence rate of adverse reaction of low molecular heparin in Urology Department. Statistically analyze the occurrence rate of adverse reaction of patients with low molecular heparin before their improvement. Find out the main factors causing adverse reaction, then make corresponding measures to apply to the QCC group. Compare and analyze the difference of the occurrence rate of adverse reaction of subcutaneous injection with low molecular heparin between the control group and the QCC group before and after the QCC activity.

Results: The occurrence rate of adverse reaction of in-patients of subcutaneous injection with low molecular heparin reduced from 37.20% to 11.31% after the implement of QCC activities, and the discrepancy was statistical significant ($P < 0.05$) with a Percent Goal Met of 103% and a progress rate of 71.47% and also a remarkable improving self-assessment of the QCC members.

Conclusion: QCC activities reduced the occurrence rate of adverse reaction of subcutaneous injection with low molecular heparin in Urology Department, meanwhile improved the quality of care and enhanced the capacity of departmental staff to deal with problems.

INTRODUCTION

Quality control circle (quality control circle, QCC) refers to a spontaneously combined small group (also called QCC group) to deal with problems at operating post, in which each member shares out the work and cooperates with one another, analyzes and deals with key problems at duty with QCC tools to improve results [1]. VTE is one of common post-operation complications in patients of Urology Department, without any measures, its occurrence

can be up to 40%~60% and mortality 15% [2]. subcutaneous injection with low molecular heparin is one of the most important methods to prevent VTE. However, the use of low molecular weight heparin can cause an adverse reaction such as subcutaneous hemorrhage and induration. This study retrospectively analyzed the occurrence rate of adverse reaction of subcutaneous injection with low molecular weight heparin in Urology Department of the First Affiliated Hospital of Zhengzhou University from March 2015 to June 2015, which was 37.20%.

After the discussion of all the nurses in urology department, applying QCC activities to subcutaneous injection with low molecular weight in inpatient area since July 2015 achieved a satisfying result. Reported as follows.

METHODOLOGY

General

Selected patients with laparoscopic surgery in Urology Department of the First Affiliated Hospital of Zhengzhou University from March 2015 to October 2015 as the research object. Among them, take the patients (from March to June) without the application of QCC as a control group, 133 cases in total, 97 cases of male, 36 cases of female, with an age ranging from 37 years to 75 years (an average age of 56.3 ± 18.8 years). Take the patients (from July to October) with the application of QCC as QCC group, 145 cases in total, 106 cases of male, 39 cases of female, with an age ranging from 38 years to 73 years (an average age of 56.1 ± 17.5 years). Compare and analyze the gender, age, BMI, the course of diseases, and other general data. There was no statistically significant difference ($P > 0.05$), as shown in Table 1.

potential reasons causing adverse reaction of subcutaneous injection with low molecular heparin on four aspects of people, things, methods, environment, which were drew in the adverse reaction reason analysis fishbone diagram (Figure 1).

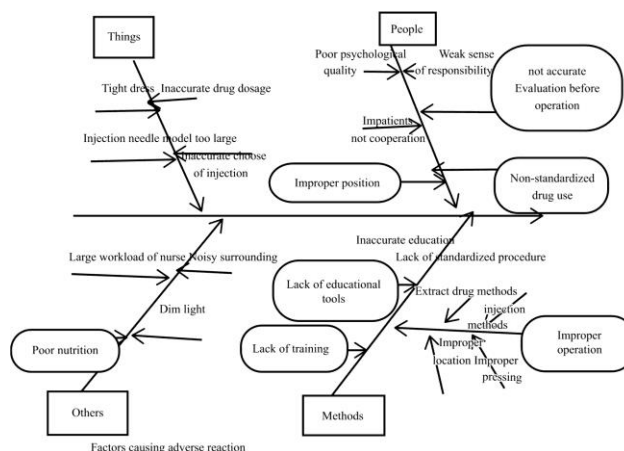


Figure 1. Fish bone diagram of reason analysis of subcutaneous injection with molecule heparin.

Circle member voted to choose reasons in seven aspects: not standard of operation, lack of education tools, not standard of drug use, lack of training, improper posture, inaccurate evaluation before the operation, poor nutrition status of patients. Tracing

Table 1. Comparison between patients before QCC and after QCC.

Grouping	Cases	Age (year)	BMI (kg/m ²)	Course of disease (day)	Gender	
					Male	Female
Control group	133	56.3±18.8	24.2±5.6	10.7±3.5	97	36
QCC group	145	56.1±17.5	24.7±6.3	10.3±3.7	106	39
P		>0.05	>0.05	>0.05	>0.05	>0.05

Establishment of QCC activity group and its application

Establish QCC activity group of Urology Department based on involuntariness, involving 7 members in total, with the leader voted democratically. Name it “QQ Circle” by vote. Make the activity theme as “reducing the occurrence rate of adverse reaction of low molecular weight heparin in Urology Department”. At the same time make activity draft table and develop one or twice activity of messed learning and discussing with 30 min ~ 1h each time.

Present situation and reason analysis

Activity group focused on the issue related to the theme, giving play to the team wisdom, finding out

back from March 2015 to June 2015, check nurse’s clinical operation, and generalize the data of patients with bleeding after subcutaneous injection with low molecular heparin and complication of induration to draw a check sheet based on the principle of 80/20 [3]. It is concluded that the main reasons were: not standard operation, lack of education tools, non-standard drug use.

In QCC activity, it was graded by 1, 3, 5 points scoring criteria [3], which was concluded that the activity team ability was 80%. According to the goal of QCC to set formula with Target value=Current value-Improved value=Current value-(Current value*Improved key point*Circle capacity) = 37.22% - (37.22% × 87% × 80%) = 37.22% - 25.91% =

11.31%. Therefore, "QQ Circle" goal was the occurrence rate of adverse reaction of patients in Urology Department decreased from 37.22% to 11.31%.

Draft and implement of measures

According to the three main factors causing the corresponding complication after the usage of low molecular weight heparin. QCC activity group came up with many measures. Based on feasibility, effectiveness, autonomy, it was evaluated with a score of 5 (most feasible), 3 (general), 1(inconsiderable). According to the principle of 80/20 [3], the score ≥ 72 was reasonable, which was taken into implement after the approve by Nursing Department.

Take measures to not the unified solution of operation specification: (1) Look up a large number of literature data, based on the original "marking criterion of subcutaneous injection", normally formulating new "marking criterion of subcutaneous injection with low molecular weight heparin", being checked and approved by the nurses over N2. (2) Enact unified appraisal program in the department, putting normalized working standard into certain department training, improving the operating skills of the clinical nurse in subcutaneous injection with low molecular weight heparin with an assess of the department staff once a month in which the ineligible required retraining and re-evaluating till became eligible.

Improved methods to lack of corresponding procedure or training tools: (1) Design "abdomen location card of subcutaneous injection with low molecular weight heparin" (Figure 2). Draw accurate injection sites of abdomen: up and down 5cm and left and right 10cm of the navel, avoiding 1-2cm around the navel [4]. Then take injection into these sites in turn according to the order from small number to big, at the same time removing the number after injecting which could avoid nurse from forgetting the injected sites causing that the space between two adjacent injection sites was too close or one site was repeatedly injected many times. As a result, it kept the distance between two adjacent injection sites were over 2cm with regularly injection. The corresponding procedure was standardized. In addition, on the upper part of the location card writes related education information of subcutaneous injection with low molecular heparin which improved the successful rate of education of patients. Give it to

the patients to hang over the right of the end of the bed to help them to further understand the knowledge of subcutaneous injection with low molecular weight heparin, which improved the compliance of the patients. (2) Record normalized teaching video for clinical care and teaching, improving nurse operating skill.

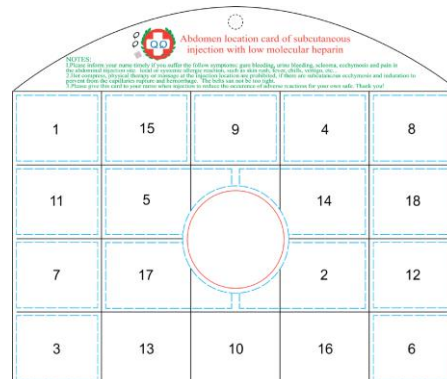


Figure 2. Abdomen location card of subcutaneous injection with low molecular weight heparin.

Note: Rotate each injection location regularly according to the number from small to big numbers since the childhood, regular rotation at the injection site. Remove a number after Bed No. Name each injection.

Measure to improve improper drug use

(1) Arrange a knowledge training on low molecular heparin drugs once a month by medical staff and regularly exam and appraise pharmacy knowledge and cautions to make sure all the medical staff master the drug specification of low molecular weight heparin. (2) Make nursing specification of subcutaneous injection with low molecular heparin. When patients were taken the first injection with low molecular weight heparin, the head nurse had to repeatedly tell the reasons that handing out the location card and the injection with low molecular heparin and cautious and made sure patients cooperate effectively. Each time nurse was on an operation which was required a location card to find out a proper site to inject after checking patients.

Verify the activity effectiveness

Compare and analyze the occurrence of the adverse reaction of subcutaneous injection with low molecular heparin between the control group and QCC group before and after the QCC activity.

Table 2. Comparison of the occurrence rate of adverse reaction rate of patients with subcutaneous injection with low molecular heparin before and after the management of QCC.

Grouping	Cases in total	Cases with adverse reaction in total	Occurrence rate of adverse reaction
Control group	2007	748	37.22%
QCC group	2514	267	10.62%
χ^2		455.23	
P		0.00	

Statistics process

Adopt SPSS 19.0 statistical software to analyze, to compare the technical data with χ^2 , $P < 0.05$ is statistically significant.

RESULTS

Visible outcome after QCC management

Summarize the occurrence rate of the subcutaneous injection with low molecular heparin in Urology Department in which the control group was injected with low molecular heparin 2007 times, with 748 times of adverse reaction with a 37.22% of the occurrence rate of adverse reaction. The experimental group was injected with low molecular heparin 2514 times, 267 adverse reactions, the 10.62% of occurrence rate of adverse reaction. The discrepancy between the two groups was statistically significant ($P < 0.05$). Seen in Table 2.

Invisible outcome after QCC management

Adopt self-marking sheet and survey each circle member on their capacity to deal with problems, confidence, cohesive force, communication and coordinating ability, quality control skill and enthusiasm with each item of 5 score excellent, 3 score good, 1 score bad. Sum up the 6 items respectively. Sum up the average score and compare with the original. Draw the radar map of the invisible outcome of QCC activity. Which showed that the score had increased in different degree after the use of QCC. Seen in Figure 3.

DISCUSSION

QCC is an organizational form continually improving quality control, which is applied to hospital care, pharmacy and medical treatment which can improve effectively the managing sense and work capacity of working staff, as a result, improving the work quality

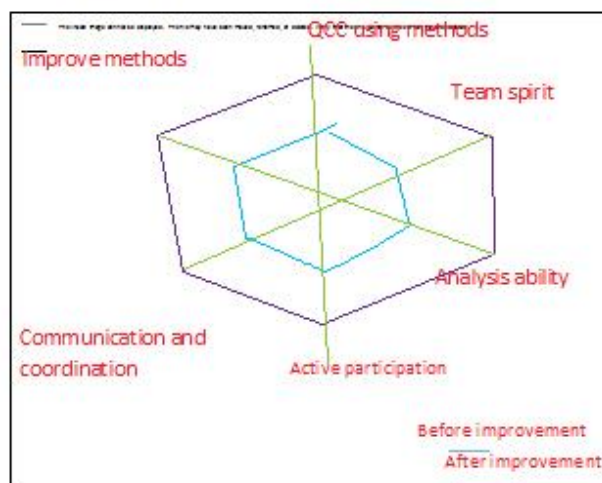


Figure 3. Radar map of the invisible outcome after QCC management.

[5]. In 1968, Taiwan took the lead in putting the QCC activity into force, spreading to the whole world since then [6]. QCC, with volunteering spirit, exploring the member potential, with team force, combining with collective intelligence, continually improves all the problems. QCC is applied to the medical management, which can cultivate medical staff in the realization of problem and capacity to deal with problems, which improves serving quality, reducing the running cost of the department, improving patient satisfaction, building harmonious teamwork. Low molecular heparin is the main method to prevent the formation of venous thrombosis. However, it easily causes subcutaneous bleeding, induration and other related complications, therefore, how to reduce the complication rate of low molecular heparin is a long-term exploration work facing the clinical workers. This study mainly applied QCC to the management of patients requiring low molecular heparin post-operation, which played an important significance on clinical guidelines.

The result showed that the occurrence rate of adverse reaction of in-patients of subcutaneous

injection with low molecular heparin reduced from 37.20% to 11.31%, which met the target goal and kept a good effect. At the same time, through this activity, the scores of the team members of self-marking increased in different degree. Therefore, applying QCC to the management of patients of subcutaneous injection with low molecular heparin post operation in preventing thrombus had an obvious advantage, improving the quality of care of department. Analyze the reasons, and here is some experience.

QCC activity made a standardized operation process of low molecular heparin injection, avoiding the randomness of a nurse by experience. New operating standards mainly optimize three aspects: (1) extracting medicine methods: after extraction of drugs, exhaust air to needle nipple, replace number 4 and number 5 needles without exhausting air; needles down before injection, flip air to the above of the liquid without exhausting air of injection. (2) choosing parts: it was required of abdominal injection sites, up and down 5cm from the navel, left and right 10 cm, avoiding the 1~2 cm around the navel, adjacent two sites at least 2 cm apart [4]. Design abdominal positioning card of subcutaneous injection with low molecular heparin because of the large nurse workload, effectively avoiding multiple injections at the same part and the too close distance between two injection sites. (3) injection methods: patients lie on the back, nipping abdominal skin with left thumb and forefinger to form a convex fold, needle vertically and push drugs without blood return. With a method of 10s continuous injection and waiting for 10s to pull out the needle, without pressure, keeping skin fold all the way, increase skin clearance, easy drug diffusion, can effectively reduce the occurrence of subcutaneous bleeding caused by drug leakage [7]. Therefore, make the standardized operation process and specification as one of the key points of the assessment of Urology department.

QCC activities increased the good health education, improving the patient's medication compliance. It was easy to appear the omission of low molecular heparin injection and the chaos at the injection sites due to the busy job of the nurse. There was relevant education information of subcutaneous injection with low molecular heparin in the upper abdomen positioning card, which was given to patients. On the one hand, it could make the patients pay more attention to related issues on subcutaneous injection with low molecular heparin, and effectively took

participation in his own treatment, improving the successful rate of education in patients. On the other hand, it played a verification role in nurse operation, urging nurse to operate in standard, and regularly numeric rotate injection could effectively reduce the adverse reactions after the injection, thereby increasing the patient's medication compliance.

QCC activity improved the working enthusiasm of nurses with a focus on the volunteering to take part in, making the member enjoy a higher autonomous right, participation right, and management right. The nurse could positively take part in the activity of analyzing the reason of problems and enacting rectification measures and implement after the implement of QCC activity in our department. The whole staff positively participated in the implementation and improvement of the quality of care management, making each member had a sense of being respected, recognized and got an achievement of self-realization at the same time realized the purpose and significance in work, which stimulated their work enthusiasm and enhanced their sense of responsibility.

QCC activity improved the efficiency of the team with a focus on collective wisdom. In QCC activity, team members paid more attention to improve the ability of observation, analysis, and cooperation of the nursing work. In the process of going on one phase to another, the circle members positively communicated with others and exchanged views, which harmonized their relationship, enhanced their collaboration and improved the cohesion of nurses, making work process more smoothly, therefore improving the working efficiency of nurses.

The medical staff of Urinary Department in The First Affiliated Hospital of Zhengzhou University took "reducing the occurrence rate of adverse reaction of subcutaneous injection with low molecular heparin" as one of the themes of quality improvement, and applied QCC activity to the postoperative nursing care in Urology Department. This activity effectively reduced the incidence rate of related postoperative complications with the application of low molecular heparin, improving the quality of care. However, since this study only developed in urological surgical wards, with a short time of implementation, there still existed certain limitations in its results. The QCC needed continuously exploring and improving in relevant problems in future, to realize its sustainable development [8].

As mentioned above, QCC method played a good role in care management of reducing the complications of low molecular heparin improving nursing management. The QCC activity made the nursing work process more refined, improved the quality of care, stimulated the enthusiasm of the medical staff and improved patient satisfaction. Therefore, the implement of QCC activity not only reduced the occurrence rate of adverse reaction of subcutaneous injection with low molecular weight and but also enhanced the capacity of circle members to think independently and deal with problems and also their team spirit and responsibility consciousness. However, whether the operation process can be rolled out in the whole clinical departments or not, and how is its long-term effect still need a further discussion and research.

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