The Comparative Study for Quality of Trauma Treatment Before and After the Revision of Trauma Audit Filter, Khon Kaen Hospital 1998

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Abstract

This study was conducted in 1997-1998 in order to improve the quality of treatment of trauma care in Khon Kaen Regional Hospital by revision of the trauma audit filter which was set up in 1997. After the implementation of the revised audit filter by the method of participatory action research (PAR), the trauma preventable death rate was decreased to 2 per cent which was statistically different from the preventable death rate in 1994 and the pitfalls of trauma treatment and pitfalls contributing to mortality was also statistically significantly decreased when compared with the result in 1994 and 1995. The compliance of physicians in 23 items from 32 items in trauma audit filter was more than 80 per cent.

Key word : Trauma Audit Filter, Preventable Death

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To improve the quality of trauma management, Khon Kaen Hospital launched the Trauma Audit for Hospital Care Improvement Project in 1994 by putting TRISS methodology into the trauma registry for grading the severity of injury. The outcome and pitfalls of trauma treatment during 6 months before and after the implementation of the trauma audit filter were analyzed. After the implementation of the trauma audit filter, the preventable death rate decreased from 3.2 per cent to 2.7 per cent and the pitfalls in trauma treatment and pitfalls contributing to mortality decreased from 407 points

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to 301 points and 265 points to 217 points respectively.

However, there were some issues which had to be improved as follows :

1. There were many dead, injured patients in the preventable death group. This problem indicated that the process in trauma audit was not efficient enough to decrease the mortality rate in the preventable death group.

2. The trauma audit filter did not cover all treatment processes and some items in the trauma audit filter were impracticable.

3. There was no assessment of physician's compliance.

4. There were problems of system inadequacy that had not been solved as follows:

- Problem of report and communication.
- Delayed admission.
- Over occupied beds.
- New personnel were in ignorance of the project so they did not comply with the trauma audit filter.
- Increase in number of patients.
- Shortage of specialists such as neuro surgeons.
- Shortage of nurses.
- Shortage of equipment such as CT Scan.
- Others.

5. The trauma treatment process had to rely on nurses' cooperation but at that time the nursing audit filter had not been established.

Therefore, to reduce the mortality and pitfalls resulting from trauma treatment, it was necessary to improve and build a more efficient medical audit filter, to establish the nursing audit filter and to solve the problem of system adequacy.

Objectives

1. To improve the medical audit filter for trauma patients attending Khon Kaen Hospital and to compare the mortality rate before and after the trauma audit filter implementation in the preventable death group.

2. To study the compliance of physicians concerned.

Research Method

This project used the method of Participatory Action Research (PAR) and Research and Development method.

Implementation Methodology

1. Preparatory Phase

a. Preparation for assessing the quality of service.

- Create the death form for recording data of dead injury patients.
- Create the hospital trauma audit committee assessment form with the suggestion and definition for filling the form in order to explore the factors contributing to mortality in peer group review.
- Create the compliance monitoring form for monitoring compliance of physicians.

b. Establish the medical audit filter conforming with the conceptual framework.

- Hold meetings of the trauma audit committee to revise the trauma audit filter.
- Prepare the documents used in training the staff concerned.

c. Create the method to monitor the com-pliance of physicians.

- A monitor team was set up and a meeting was held to inform the staff about their duties. This team had to use the compliance monitoring form to monitor the physician's compliance.
- The team visited injured patients admitted to the hospital and monitored the physician's treatment. The schedule of monitoring was as follows:

- Tuesday	Afternoon shift
- Friday	Night shift
- Saturday	Morning shift
- Sunday	Afternoon shift

2. Audit Filter Implementation

a. Hold a meeting to inform the staff concerned to change the working system by using the medical audit filter as the guideline of providing treatment.

b. Train the staff concerned to enable them to manage and provide trauma care accurately and efficiently.

c. Conference.

- Morning Report.
- Mortality Morbidity Conference.
- Case Conference.
- X-ray Conference.

d. Hold the orientation program for medical students and interns.

e. Solve the problems of system inadequacy by using the method of hospital accreditation as follows:

- Report and communication problem.

Solve by using the transceiver for communicating.

- Delay admissions.

Assign the surgeon to be on shift at the ER.

- Over occupied beds.

Revise the admitting system of ER and OPD and revise the referral system.

- Increase in number of patients.

Set up the Injury Prevention Project.

- Others.

f. The medical audit filter and nursing audit filter for trauma patients were simultaneously implemented.

3. Outcome study

A. Inclusion criteria

1. Data of all trauma patients was recorded in trauma registry forms.

2. Data of trauma patients who were admitted during the afternoon shift on Tuesday and Sunday, during the night shift on Friday, and during the morning shift on Saturday were recorded in the compliance monitoring forms.

3. Data of all dead patients were recorded in death forms.

B. Exclusion criteria

The injured patients who had underlying diseases (such as hypertension; DM; heart disease; cirrhotic liver disease; malignancy; renal disease; chronic lung disease; collagen disease) were excluded.

C. Process

1. Data of all injured patients attending the ER was recorded in the trauma registry. The data in the trauma registry was keyed in the computer and was analyzed by the computer.

2. Data of the dead patient was recorded in the death form. Then it was sent to the hospital trauma audit committee to explore the factors contributing to mortality, to group the type of the dead patient and to fill in the data in the hospital trauma audit committee assessment forms.

3. The monitoring team selected the injured patients admitted to the hospital on Tuesday during the afternoon shift, Friday's night shift, Saturday's morning shift and Sunday's night shift, in order to monitor the compliance of physicians by using the compliance monitoring forms.

D. Evaluation

1. Death rate by severity

Data in the trauma registry was analyzed for computing.

a. TRISS value of all patients.

b. Mortality rate by severity (Ps<0.25-0.50, Ps>0.50).

2. Preventable death and factors contributing to mortality (peer group review).

The hospital trauma audit committee held a meeting to analyze the problems of medical care for the dead patients in each station (ER, Operation Room, ICU and wards) and to assess whether the death of an injured patient was a preventable death or potential preventable death or non preventable death.

3. Trauma audit implementation and compliance

Study from the compliance monitoring form collected by monitor team.

E. Compare the outcome of medical care of 1997 with the outcome of 1994 and 1995

4. Analysis and Report

The methods used in computing and comparing were as follows:

a. Percentage

b. Chi-square test and Chi-square for trend

Duration

1. Preparatory phase	3 months	(April - June 1997)
2. Audit filter implementation	2 months	(July - August 1997)
3. Outcome study	6 months	(September 1997 - February 1998)
4. Analysis and report	6 months	(March - August 1998)

RESULT

1. General Data

In 1994, there were 8,578 injured patients. 2,930 of them were admitted to hospital and 217 injury patients died.

In 1995, there were 7,967 injured patients. 2,492 of them were admitted to hospital and 206 injury patients died.

In 1997, there were 6,953 injured patients. 2,233 of them were admitted to hospital and 165 injury patients died. Table 1.

2. The trauma audit committee assessed the deaths of injured patients and found that the preventable death rate in 1997 was only 2.0 per cent. The preventable death rate of 1994, 1995 and 1997 was analyzed for exploring the trend and it was found that the death rate of these 3 years produced statistically significant difference. Whereas, the death rate in the non-preventable and potentially preventable death group did not produce any statistically significant difference.

3. Pitfalls of trauma treatment happened in each station

The pitfall of trauma treatment in 1997 was only 161 points and pitfall contributing to death was 86 points. Compared with 1994 and 1995, they produced statistically significant difference.

4. In 1997, the results of the study on medical audit filter compliance are shown in Table 4.

DISCUSSION

1. After revising the trauma audit filter of 1995 along with solving the problems of system inadequacy and implementing the nursing audit filter, the preventable death rate decreased from 3.2 per cent in 1994 to 2.7 per cent in 1995 and in 1997 the death rate was only 2.0 per cent. When we compared the death rate of 1995 with the death rate of 1997, the difference of these two years was not statistically significant. However, comparing the preventable death rate of 1994 with that of 1997, it was found that the rate of these 2 years produced statistically significant difference.

Whereas, the differences between the death rate in the potentially preventable group and the death rate in the non preventable group was not statistically significant.

After studying the pitfalls in the trauma treatment process, it was found that the death rate of the preventable group tended to decrease, whereas, the trend of the death rate in the potentially preventable and non preventable group did not decrease.

2. The decrease of pitfalls in trauma treatment and pitfalls contributing to mortality were statistically significant.

Table 1. Number of injured patients attending Khon Kaen Hospital from July - December 1994, March - August 1995 and September 1997 - February 1998.

Sex	July - December 1994			March - August 1995			September 1997 - February 1998		
	No.	Admit	Dead	No.	Admit	Dead	No.	Admit	Dead
Male	6,491	2,193	171	6,055	2,177	168	5,052	1,778	130
Female	2,087	539	46	1,912	375	38	1,901	455	35
Total	8,578	2,732	217	7,967	2,492	206	6,953	2,233	165

Table 2. Mortality rate assessed by trauma audit committee.

Type	1994			1995			1997		
	No	Dead	%	No	Dead	%	No	Dead	%
Non-Preventable	89	76	85.4	113	94	83.2	106	99	93.3
Potentially	75	59	87.7	62	50	80.6	35	23	65.7
Preventable	2,546	82	3.2	2,317	62	2.7	2,091	42	2.0
Total	2,710	217	8.0	2,492	206	8.2	2,232	164	7.3

Table 3. Pitfalls in the management of trauma patients.

Year	Station	Type of pitfall					
		Delay Dx No/C*	Error DX No/C*	Error Rx No/C*	Error Technique No/C*	System Inadequacy No/C*	Total No/C*
1994	Pre-hospital	2/2	4/4	81/51	-	25/4	112/61
	ER	1/1	1/-	14/3	2/-	24/2	42/6
	Trauma Ward	7/7	18/9	93/80	-	79/51	197/147
	OR	-	-	-	10/10	3/3	13/13
	ICU	-	-	28/24	-	1/-	29/24
	Orthopedic	-	1/1	6/6	-	7/7	14/14
	Total	10/10	24/14	222/164	12/10	139/67	407/265
1995	Pre-hospital	4/3	1/1	50/33	-	20/-	75/37
	ER	1/1	1/1	8/6	1/-	4/-	15/8
	Trauma Ward	8/5	6/5	100/84	6/4	60/46	180/144
	OR	-	-	-	12/11	5/4	17/15
	ICU	-	-	14/13	-	-	14/13
	Orthopedic	-	-	-	-	-	-
	Total	13/9	8/7	172/136	19/15	89/50	301/217**
1997	Pre-hospital	2/1	2/2	7/3	-	24/-	35/6
	ER	-	1/-	4/2	-	2/-	7/2
	Trauma Ward	4/3	4/3	55/35	2/1	35/24	100/66
	OR	-	-	-	6/4	2/1	8/5
	ICU	-	-	6/5	-	3/1	9/6
	Orthopedic	-	-	1/1	-	1/-	2/1
	Total	6/4	7/5	73/46	8/5	67/26	161/86**

* Contribute to Mortality
** Statistical Significance $P<0.05$

3. The compliance of physicians was high. It was found that the compliance of most items in the medical audit filter was more than 80 per cent. There were only 9 items from 32 items in which compliance was less than 80 per cent.

1) C-spine XR	33.6 %
2) Cervical collar	41.1 %
3) O_2 for multiple injury patients	77.9 %
4) Dx. eye injury	66.7 %
5) Emergency laparotomy for abdominal injury in 6 h.	61.5 %
6) Emergency craniotomy for head injury in 4 h.	22.9 %
7) Compound fracture in 12 h.	15.9 %
8) Spine injury in 6 h.	29.6 %
9) Doctor Hx., PE record	38.2 %

All the data above were very important for improving the Trauma Audit Project in Phase 3.

4. The key element for implementation.

1) Use the method of Research and Development and Participatory Action Research as the guideline for implementation.

2) Use TRISS score derived from the trauma registry for assessing the quality of medical care and set up a team to use this instrument to assess the quality of medical care.

3) The major methodologies for improving quality of trauma treatment consist of :

3.1 Improve the efficient and practicable medical audit filter.

3.2 Create the nursing audit filter.

3.3 Improve the problems of system inadequacy which were found in peer review by the trauma audit peer review team.

4) Use the methodology of hospital accreditation, such as team work and sustained development, to put the above three methodologies into the treatment process.

Table 4 Medical audit filter compliance (1 September 1997 - 28 February 1998).

A	Rapid survey	Case	Compliance	%
1	CXR in multiple injury	173	143	82.7
2	C-spine	107	36	33.6*
3	Collar	107	44	41.1*
4	Dx. hemopneumothorax	25	24	96

B	Resuscitation	Case	Compliance	%
1	O_2	143	113	77.9*
2	Intubate in GCS<10	94	93	89.9
3	Shock intervention	51	46	96.1
4	Respiratory failure Rx	84	84	100
5	CPR intervention	19	19	100
6	1st aid stop bleeding	299	291	97.3

C	Secondary survey	Case	Compliance	%
1	Diagnose abd. injury in 24 h.	41	34	82.9
2	CT scan in GSC<13	114	106	93
3	Dx TL spine injury	14	12	85.7
4	Fracture immobilization	391	365	93.4
5	Dx. dislocation	93	65	96.9
6	Dx. eye injury	3	2	66.7*
7	2nd ER visit in 72 h.	13	-	-

D	Definite treatment	Case	Compliance	%
1	GCS drop and intervention	56	56	100
2	Emergency laparotomy in 6 h.	39	24	61.5*
3	Emergency laparotomy in 4 h.	35	8	22.9*
4	Rx. compound fracture in 2 h.	270	43	15.9*
5	Rx. spine injury in 6 h.	27	8	29.6*
6	Reoperation in 48 h.	-	-	-
7	Reintubate in 48 h.	23	-	-

	Record	Case	Compliance	%
	OPD dard	587	586	99.8
	Doctor Hx., PE record	587	224	38.2*
	Nurse note	587	550	93.7
	Op note	334	327	97.9
	Anesthetic note	334	330	98.8
	Peer review			
	MM conference	26	20	76.9*
	Dead case review	6	6	100

* = The compliance was less than 80%.

5) Important procedures of hospital accreditation consist of:

5.1 Set up the Trauma Audit Committee to establish the policy and make a plan.

5.2 Set up the trauma registry improvement team to collect and analyze the data.

5.3 Set up the trauma audit peer review team to assess the preventability and pitfalls in dead cases.

5.4 Set up the trauma audit filter committee and use data gaining from assessment of the peer review team to establish the medical and nursing audit filter.

5.5 Set up the patient care lead team to explore the method for solving the problems of system inadequacy.

The patient care lead team consists of :

- Surgical patient care lead team responsible for solving the problems of communication and compliance of physicians.
- Laboratory team responsible for solving the problems of LAB report and blood service.
- X-ray team responsible for solving the problem of delay in taking the patients to the Radiology Department.
- ER team responsible for improving the efficiency of medical care in the ER.
- Ward team responsible for solving the problems of over occupied beds.
- OR team responsible for setting up an efficient system for using the operating room.

It was allowed to set up an additional team to solve the existing problems and the additional team might be a permanent or ad hoc team depending on the completeness of problem solving.

In addition to the duty of exploring the way of solving problems, these teams had the duty of putting the invented method into practice.

5.6 Set up the assessment team consisting of

- Compliance assessment team.
- Trauma registry and peer review team.

5.7 Trauma Audit Committee studied the data derived from the assessment team in order to improve the project in the next loop.

6) Future trend

The outcomes of this study revealed that there were many problems and obstacles which should be brought into consideration for improving the plan in the next phase as follows:

1. The importance and necessity of each item in the medical audit filter.
2. How to increase the compliance of surgeons in items which were less than 80 per cent?
3. Some types of injury had problems in providing medical care such as fracture of the pelvis, fracture of the skull, maxillofacial injury with massive bleeding.
4. The mortality rate of injured patients was classified by the severity of injury of other hospitals participating in the Injury Surveillance Project of Epidemiology Division.

These matters will be studied further in the third phase of this project.

SUMMARY

The Trauma Audit Committee launched the project of 'Comparative Study for Quality of Trauma Treatment before and after the Revision of Trauma Audit' which was the project in the second phase continuing from the Trauma Audit for Hospital Care Improvement Project (1994-1995). The objectives of this project were to improve the medical audit filter for injured patients and to study the compliance of physicians.

The outcome of this project revealed that after improving the medical audit filter along with establishing the nursing audit filter and improving the system inadequacy, the quality of trauma treatment was better. In addition, it was found that the preventable death rate of 1997 and 1994 produced a statistically significant decline.

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การศึกษาเปรียบเทียบคุณภาพการรักษาพยาบาลผู้ป่วยอุบัติเหตุก่อนและหลังการปรับปรุงเกณฑ์มาตรฐานการรักษาผู้ป่วยอุบัติเหตุ โรงพยาบาลขอนแก่น 2541

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คณะผู้วิจัยได้จัดทำโครงการนี้ในระหว่างปี 2540-2541 โดยมีวัตถุประสงค์เพื่อพัฒนาคุณภาพการรักษาผู้ป่วยอุบัติเหตุ โดยการแก้ไขปรับปรุงเกณฑ์มาตรฐานการรักษาพยาบาลผู้ป่วยอุบัติเหตุที่จัดทำขึ้นในปี 2537 ภายหลังจากที่บรรจุเกณฑ์มาตรฐานที่จัดทำขึ้นใหม่เข้าในกระบวนการรักษาพยาบาล โดยใช้กระบวนการของการทำวิจัยแบบมีส่วนร่วม (Participatory Action Research) ปรากฏว่าอัตราการเสียชีวิตที่สามารถหลีกเลี่ยงได้ลดลงเหลือ 2.1% ซึ่งแตกต่างอย่างมีนัยสำคัญจากอัตราการเสียชีวิตที่หลีกเลี่ยงได้ในปี 2537 ข้อผิดพลาดในการรักษาพยาบาลและข้อผิดพลาดที่มีผลทำให้ผู้ป่วยเสียชีวิตลดลงอย่างมีนัยสำคัญจากปี 2537 และ 2538 แพทย์ให้ความร่วมมือในการปฏิบัติตามเกณฑ์มาตรฐานเกิน 80% ถึง 23 ข้อ จาก 32 ข้อ

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