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Competition Test Veteran Affairs Medical Centre (VAMC) Score And KIMS-14 For Predicting the Dehiscence of Abdoment Post Laparotomy Operating Wounds

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Abstract

Introduction. Abdominal wound dehiscence (AWD) is a complication of severe postoperative abdominal surgery, with reported death rates ranging from 10% to 45%. Significant mortality, prolonged hospitalization, increased incidence of incisional hernias and reoperations for ruptured stomachs, with costs associated with the community, emphasize the severity of these complications. The VAMC score and KIMS-14 can be used as screening in predicting surgical injury dehiscence

Method. This study is a diagnostic test study to assess the sensitivity and specificity of VAMC and KIMS-14 scoring in predicting the occurrence of abdominal wound dehiscence to be performed in surgery outpatient and digestive surgery ward at the General Hospital, Dr. Mohammad Hoesin Palembang in the period March to May 2019.

Results. There were 44 subjects that participated in this study. VAMC has a sensitivity value of 87.5% and specificity of 97.2 with an area under curve value of 0.958 with a cut-off of > 10. KIMS 14 has a sensitivity value of 100% and a specificity of 94.4% with an area under curve value of 0.944 with a cut-off of > 5.

Conclusion: KIMS-14 is better in sensitivity, but VAMC is more specific to predict dehiscence licensing in patients undergoing intraabdominal surgery.

Keywords: VAMC, KIMS-14, abdominal wound dehiscence, post-laparotomy, mortality, burst abdomen.

Introduction

Abdominal wound dehiscence (AWD) is a complication of severe postoperative abdominal surgery, with reported death rates ranging from 10% to 45%. AWD is defined as reopening a closed abdominal incision with a separation of the stomach lining, including fascia. Dehiscence abdominal injuries can be partial or complete and can cause evisceration of stomach contents. Various literature says the incidence rate varies between 0.4% and 3.8% and AWD recurrence is seen in 0% to 10.9% of cases. AWD is most commonly observed on days 9 to 10 but varies between 0 and 32 days. In 90% of all cases, AWD appears on its own before the 15th postoperative day. On the first day after surgery, the ability of the wound to close does not yet exist, but this increases with time. In the third week after closing the incision, the strength of the wound to close reaches 20% and after 6-12 weeks 70-80%. The cause of AWD in many cases is due to tearing of the sutures through the fascia. Other possible causes are infection, broken stitches, facial necrosis and loose knots. According to the literature, after recovery from AWD incisional hernias are seen in 13% to 83% of patients.[1-5]

Several studies have been published that compare different material and suturing techniques and this in terms of complications such as the incidence of wound infections, incisional hernias and ruptured stomachs. The same is true for risk factors for a ruptured stomach, but this is very different from the limited number of studies that discuss treatments for a ruptured abdomen. In addition, there are many variations in reported mortality, recurrence and incisional hernia after dehiscence of abdominal injuries and little is known about quality of life.[1-5]

Several studies have identified risk factors associated with this complication; However, many reports have conflicting results. Two studies, by Webster C, et al in 2003 and Gokak, et al in 2017, were reported to be a scoring system developed based on multivariable stepwise logistic regression models of preoperative, intraoperative and postoperative variables entered sequentially as independent predictors of wound dehiscence. Both risk scoring systems were validated by the authors of this study based on the population studied; they help clinical management. However, whether this scoring system can accurately predict dehiscence abdominal injuries in other populations remains unclear.[3,4,6]

The first scoring system is based on data from the Veterans Affairs National Surgical Quality Improvement Program (NSQIP) used at 132 Veterans Affairs Medical Centers between October 1996 and September 2000, hereinafter referred to as VAMC risk scores. The second scoring system is based on a medical register that was developed from July 2014 to January 2017 at a KIMS Hubli hospital, India, hereinafter referred to as the KIMS-14 score. For both scoring systems, a higher score predicts a higher risk.[3,4,6]

In the analysis of Jakub's research between the VAMC scoring and the dehiscence licensing event, it was found that the VAMC showed an AUC value of 0.84 (OR 1.1 CI 95% 1.1 - 1.2). In the Gokak study, KIMS-14 did not show AUC values. In the Gokak study, it showed that the age variable > 60 years (P = 0.013) male sex (p = 0.001), hypotension (p ≤ 0.005), duration of symptoms (p = 0.005) chronic lung disease, anemia (anemia) p = 0.005), hyperbilirubinemia (p = 0.005), albumin level, (p ≤ 0.005), uremia (p = 0.005), time of operation (p = 0.005), peritonitis perforation or contaminated wounds (p = 0.005) have a prevalence that is higher abdominal wound dehiscence licensing. However, the two scoring systems show very significant results regardless of the results of the AUC curve. [3,4,6]

Jakub also got the result that VAMC would look very specific 94% with a cut-off point of 25 points / 44 points (max) with an accuracy of 83%, but not sensitive (48%). When the cut-off is reduced by 14 points (based on Webster's research in 2003), a sensitivity result of 70% is obtained, a specificity of 82% with an accuracy value of 73%. This Gokak study did not show the cut-off point value nor its sensitivity and specificity, in this study only showed that the higher the total score obtained the higher the risk of abdominal wound dehiscence licensing.[3,4,6]

Significant mortality, prolonged hospitalization, increased incidence of incisional hernias and reoperations for ruptured stomachs, with costs associated with the community, emphasize the severity of these complications. This makes researchers want to examine the abdominal wound dehiscence licensing using tools / references to the occurrence of the dehiscence. Reference in this case is risk factor score KIMS-14 and VAMC. This research has never been carried out at the Central General Hospital Dr. Mohammad Hoesin Palembang.[6-10]

Methods

This study is a diagnostic test study to assess the sensitivity and specificity of VAMC and KIMS-14 scoring in predicting the occurrence of abdominal wound dehiscence licensing.

The sample in this study were all sufferers who underwent digestive surgery and received treatment at the General Hospital Center Dr. Mohammad-Hoesin Palembang during the period March 2019 - May 2019 who met the inclusion and exclusion criteria.

After obtaining approval from Dr. Mohammad Hoesin Hospital Research Ethics Committee / Faculty of Medicine, Universitas Sriwijaya, patients who have entered the inclusion criteria and approved informed consent signed by the patient or their representative, carried out sampling through patient follow-up directly starting from preoperatively to postoperatively up to week 12. The closure of the operation will be carried out by a senior level 4 surgical resident.

The data collected is the result of recording primary data obtained from directly assessing the condition of patients undergoing intraabdominal surgery and getting treatment at the General Hospital Center Dr. Mohammad-Hoesin Palembang during the research period.

Statistical tests to prove the sensitivity of VAMC and KIMS-14 scores as predictors of abdominal wound dehiscence licensing, diagnostic tests were carried out which included several quantities such as sensitivity, specificity, ROC curves using statistical Med Calc and SPSS.

Results

Subject distribution based on VAMC criteria

Subject distribution based on VAMC criteria can be seen in table 1**.** In the distribution of subjects based on VAMC criteria, it was found that 4.5% of subjects had a history of CVA / stroke, 9.1% of subjects had a history of COPD, 0% had a diagnosis of pneumonia, 27.3% of subjects who underwent emergency surgery, 13.6% of subjects who underwent more than 2.5 operations hours, 47.7% of subjects undergoing surgery by residents, 9.1% of subjects who had clean wound, 13.6% of subjects who had superficial wound infection, 4.5% of subjects who had deep wound infection, 0.0% with weaning failure, 9.1% of subjects with> 1 complication. ROC analysis test was performed to see the sensitivity and specificity value of VAMC criteria for the occurrence of abdomen wound dehiscence licensing, it was found that the VAMC had a sensitivity value of 87.5% and specificity of 97.2 with an area under curve value of 0.958 with a cut-off of > 10.

Table 1 Distribution of subjects based on VAMC criteria

Variable	N	(%)
History of CVA / stroke		
Yes	2	4.5
No	42	95.5
PPOK history		
Yes	4	9.1
No	40	90.9
Pneumonia		
Yes	0	0.0
No	44	100.0
Emergency Surgery		
Yes	12	27.3
No	32	72.7
Surgery >2.5 jam		
Yes	6	13.6
No	38	86.4
PGY4		
Resident	23	52.3
Consulate	21	47.7
Clean Wound Classification		
Yes	4	9.1
No	40	90.9
Superficial Wound Infection		
Yes	6	13.6
No	38	86.4
Deep Wound Infection		
Yes	2	4.5
No	42	95.5
Weaning Failure		
Yes	0	0.0
No	44	100.0
More than 1 complication		
Yes	4	9.1
No	40	90.9
Back Surgery		
Yes	0	0.0
No	44	100.0

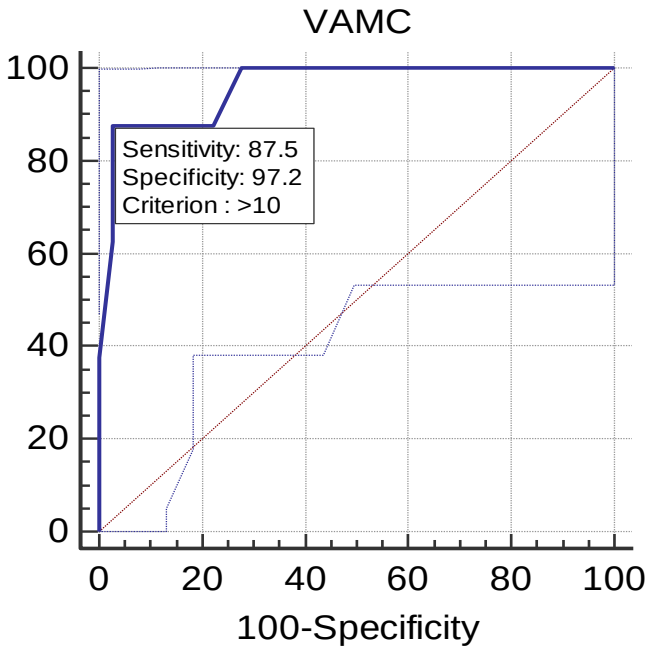

Figure 1. ROC VAMC Curve for Abdomen Wound Dehiscence

Subject distribution based on KIMS14 criteria

Distribution of subjects based on KIMS14 criteria can be seen in table 2. In the distribution of subjects based on KIMS14 criteria, 22.7% of subjects had hypoproteinemia, 4.5% of subjects had uremia, 13.6% of subjects underwent surgery for more than 2 hours, 11.4% of subjects had perforation, 0% were diagnosed with pneumonia, 27.3% of subjects were diagnosed with anemia, and 22.7% of subjects were older than 60 years. ROC analysis test was performed to see the sensitivity and specificity value of KIMS14 criteria for the occurrence of Abdomen Wound Dehiscence Licensing, it was found that KIMS14 had a sensitivity value of 100% and specificity of 94.4% with an Area Under Curve value of 0.986 with a cut-off of > 5.

Table 2. Distribution of subjects based on KIMS14 criteria

Variable	N	(%)
Hypoproteinemia		
Yes	10	22.7
No	34	77.3
Uremia		
Yes	2	4.5
No	42	95.5
Operation > 2 hours		
Yes	6	13.6
No	38	86.4
Perforation		
Yes	5	11.4
No	39	88.6
Pneumonia		
Yes	0	0.0
No	40	100.0
Anemia		
Yes	12	27.3
No	32	72.7
> 60 years old		
Yes	10	22.7
No	34	77.3

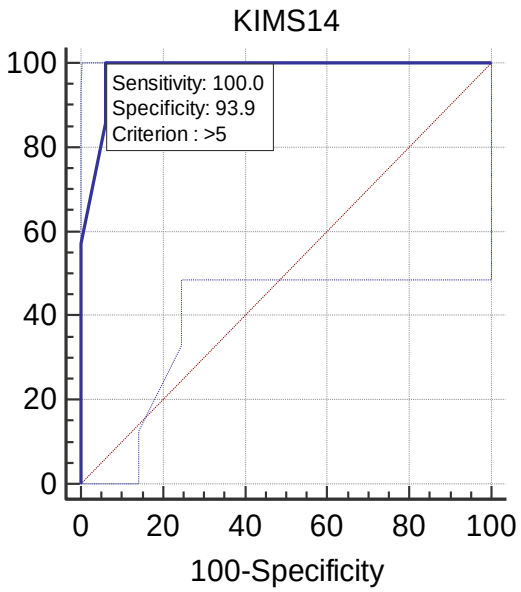

Figure 2. KIMS14 ROC curve for Abdomen Wound Dehiscence

Distribution of VAMC Scoring towards Abdomen Dehiscence Licensing

The distribution of VAMC scoring of Abdomen Dehiscence licenses can be seen in table 4.4. In the distribution of subjects based on VAMC scoring of Abdomen Dehiscence Licenses, 97.2% of subjects who had a VAMC score ≤ 10 and 2.8% of subjects who had a VAMC score > 10 in the undiagnosed Dehiscence Licensing group, while there were 12.5% subjects who had a VAMC score skor10 and 87.5% of subjects who had a VAMC score > 10. In the *Fisher's Exact* analysis-test it was found that the VAMC score was significantly related to Abdomen Dehiscence Licensing.

VAMC	Abdomen Dehiscence	
	Yes	No
≤ 10	1 (12.5%)	35 (97.2%)
> 10	7 (87.5%)	1 (2.8%)

Table 4.4. VAMC Scoring of Abdomen Dehiscence Licenses

Distribution of KIMS14 Scoring towards Abdomen Dehiscence Licensing

The distribution of the KIMS14 scoring of Abdomen Dehiscence licenses can be seen in table 4.5. In the distribution of subjects based on KIMS14 scoring of Abdomen Dehiscence Licensing, 94.4% of subjects had a KIMS14 score of ≤ 5 and 5.6% of subjects who had a KIMS14 score of > 5 in the undiagnosed group, while there were 0.0% of subjects who had a KIMS14 score of ≤ 5 and 100.0% of subjects who had a KIMS14 score > 5. In the *Fisher's Exact* analysis-test it was found that the KIMS14 score was significantly related to Abdomen Dehiscence Licensing.

KIMS14	Abdomen Dehiscence	
	Yes	No
≤5	0 (0.0%)	34 (94.4%)
>5	8 (100.0%)	2 (5.6%)

Discussions

Abdominal wound dehiscence (AWD) is a complication of severe postoperative abdominal surgery, with reported death rates ranging from 10% to 45%. AWD is defined as reopening a closed abdominal incision with a separation of the stomach lining, including fascia. Dehiscence abdominal injuries can be partial or complete and can cause evisceration of stomach contents. Various literature says the incidence rate varies between 0.4% and 3.8% and AWD recurrence is seen in 0% to 10.9% of cases. AWD is most commonly observed on days 9 to 10 but varies between 0 and 32 days. In 90% of all cases, AWD appears on its own before the 15th postoperative day.

Webster in 2003 invented a scoring system in Veteran Affairs, USA which became known as the VAMC (Veteran Affairs Medical Centre) or Veteran Affairs National Surgical Quality Improvement Program (NSQIP). This scoring is based on the prognostic characteristics of patients undergoing laparotomy with AWD. Gokak discovered a new scoring system in India which became known as KIMS 14. This scoring is based on the following risk factors for SWD: Age (> 65 years), hypo-albuminemia, wound infection, ascites, obesity, steroid use, COPD, pneumonia, cerebrovascular, accident with residual deficits, anaemia (Haematocrit <30) , prolonged ileus, postoperative cough, emergency operation time and operation of more than 2.5 hours.

In the ROC analysis test to see the sensitivity and specificity value of VAMC criteria for the occurrence of abdominal wound dehiscence licensing, it was found that the VAMC has a sensitivity value of 87.5% and a specificity of 97.2 with an Area Under Curve value of 0.958 with a cut-off of > 10. In the ROC analysis test to see the sensitivity and specificity value of KIMS14 criteria for the occurrence of Abdomen Wound Dehiscence Licensing, it was found that KIMS14 has a sensitivity value of 100% and specificity of 94.4% with an Area Under Curve value of 0.944 with a cut-off of > 5. In the ROC analysis-test it can be seen that KIMS14 is not very superior compared to VAMC. In the Fisher's Exact analysis-test it was found that the VAMC score was significantly related to Abdomen Dehiscence Licensing with a p value < 0.00. In the Fisher's Exact analysis-test it was found that the KIMS14 score was significantly related to Abdomen Dehiscence Licensing.

In the results of Jakub's research analysis between the VAMC index and Rotterdam on dehiscence Licenses, it was found that VAMC was slightly superior compared to Rotterdam. VAMC shows AUC value of 0.84 (OR 1.1 CI 95% 1.1 - 1.2) and Rotterdam shows AUC value of 0.76 (OR 2.2 CI 95% 1.7 - 2.9). However, both of these scores showed very significant

results regardless of the results of the AUC curve. When viewed from the OR value, Rotterdam looks superior to VAMC, but these results show significant results. Jakub also got the result that VAMC would look very specific 94% with a cut-off point of 25 points / 44 points (max) with an accuracy of 83%, but not sensitive (48%). When the cut-off is reduced by 14 points (based on Webster's research in 2003), a sensitivity result of 70% is obtained, a specificity of 82% with an accuracy value of 73%.[4,6,31]

Gokak examined 30 cases of AWD post emergency laparotomy and compared with 60 selected controls. AWD was reported on average 9 days postoperatively. One patient reported experiencing AWD after being discharged from the hospital at the time of the removal of the stitches from the local hospital. Gokak found that the age group > 60 years (P = 0.013) male sex (p = 0.001), hypotension (p ≤ 0.005), duration of symptoms (p = 0.005) chronic lung disease, Anaemia (p = 0.005), hyperbilirubinemia (p = 0.005), albumin level, (u ≤ 0.005), uremia (p = 0.005), time of operation (p = 0.005), perforated perforation or contaminated injury (p = 0.005) are risk factors for abdominal dehiscence licensing, but , Gokak does not specify a cut-off value that can be a limitation for abdominal dehiscence licensing. Gokak only said that "the higher the score, the greater the risk of wound dehiscence". With the discovery of KIMS14 and VAMC as scoring that is sensitive and specific in predicting the occurrence of abdominal dehiscence licensing, this scoring system indirectly minimizes hospital costs before abdominal dehiscence license injuries occur.

Conclusion

KIMS-14 is superior in sensitivity, but VAMC is superior in specificity to predict the occurrence of dehiscence licensing in patients undergoing intraabdominal surgery at General Hospital Dr. Mohammad Hoesin Palembang. KIMS-14 has a cut-off of 5 with a sensitivity of 100.0% and a specificity of 94.4%. VAMC has a cut-off of 10 with a sensitivity of 87.5% and a specificity of 97.2%

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