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## **Special Feature Article**

### **Clinical Characteristics of Patients Admitted to Emergency Medical Departments Following Serious Suicide Attempts and the Outcomes of an Assertive Case Management Intervention**

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#### **Abstract**

Patients admitted to emergency medical departments due to serious injuries often choose highly lethal suicide methods, such as hanging or jumping from heights. Prevention of recurrent suicidal behavior is critical because a history of suicidal behavior, including suicide attempts, is the strongest risk factor for future suicide deaths. Furthermore, individuals who have attempted suicide tend to use more lethal methods in subsequent suicide attempts.

The authors' institution Sapporo Medical University Hospital operates the only advanced critical care and emergency center in Hokkaido, Japan. Data were analyzed for all admissions from 2016 to 2020. The center primarily admits patients with life-threatening injuries, and more than half of patients who attempted suicide result in death. Suicide mortality rates were higher among male than female patients. Hanging was the most frequent method of suicide death, followed by jumping from heights. Nearly all patients met the diagnostic criteria for a mental disorder; 42% classified as having a mood disorder (F3) according to the International Classification of Diseases and Related Health Problems 10th revision.

Patients who survived their attempts received an assertive case management intervention. The effectiveness of the program in preventing recurrent attempts was

previously demonstrated in a randomized controlled multicenter trial (ACTION-J study). Since its inclusion in the national medical fee schedule in 2016, 58 patients have participated in the program at our facility as of April 2021. Following the intervention, no recurrent suicide attempts were identified during 6-months follow-up period. The intervention program appears to be highly feasible for implementation at the facility providing emergency medical for patients with severe injuries following suicide attempts.

**Keywords:** suicide attempt, prevention of recurrent suicide attempts, emergency psychiatry, assertive case management

## Introduction

Numerous reports indicate that over 90% of individuals who attempted suicide meet the criteria for mental disorders. Furthermore, the strongest risk factor for suicide is a history of self-harm behaviors including suicide attempts. Therefore, initiating appropriate therapeutic interventions for patients admitted to emergency medical departments following a suicide attempt is crucial for effective prevention of future suicidal behavior; this proactive approach is a vital responsibility for psychiatrists. This paper outlines the psychiatric characteristics of patients who have been admitted to emergency departments in critical physical conditions following a suicide attempt. Furthermore, it describes the characteristics of patients admitted to Sapporo Medical University Hospital (hereinafter referred to as our facility),

and details our assertive case management efforts aimed at preventing recurrent suicide attempts.

## I. Characteristics of Individuals Transported to Emergency Departments in Critical Physical Condition Following Suicide Attempts

Individuals transported to emergency medical departments in critical physical condition, as expected, predominantly select highly lethal suicide methods for their suicide attempts. Generally, distinct differences in age, sex, and other factors are observed between individuals who die by suicide and those who survive suicide attempts; thus the characteristics of individuals who engage in non-fatal attempts do not necessarily reflect those of individuals who die by suicide.<sup>2)</sup> However, the characteristics of patients who make highly lethal suicide attempts are

considered to be very similar to those of individuals who die by suicide.<sup>17)</sup>

Previous reports indicate that males tend to select suicide methods with higher lethality than females.<sup>11)</sup> Other reports also show that the suicide mortality rate is higher among males, while the frequency of suicide attempts is higher among females.<sup>3)</sup> Furthermore, the suicide rate is generally higher among older individuals than younger ones, with a larger proportion of attempts resulting in death.<sup>7)</sup> Possible reasons for this include the use of more lethal methods compared with younger individuals, lower physical reserve capacity, and, in the case of elderly individuals living alone, delayed discovery.

While numerous suicide risk factors are known, the most significant is a history of previous self-harm behavior including suicide attempts.<sup>14)15)</sup> It is also suggested that with each subsequent suicide attempt, individuals tend to choose more lethal methods.<sup>5)</sup> Therefore, prompt intervention without delay for patients admitted to critical care and emergency centers following suicide attempts significantly affects the outcomes and prognosis.

Generally, a mental health condition is identified in over 90% of individuals who attempt suicide, with mood disorders such as depression being particularly common.<sup>4)</sup> Among other

condition, schizophrenia is also associated with high suicide mortality, with the lifetime risk of death by suicide for patients with schizophrenia estimated to be approximately 5%.<sup>16)</sup> Reports indicate that suicide attempts in patients with schizophrenia also frequently involve highly lethal suicide methods.<sup>6)</sup> The authors conducted a comparative study of clinical characteristics and suicide attempt methods among 65 patients diagnosed with schizophrenia and 95 diagnosed with mood disorders, selected from 397 individuals admitted to our facility following a suicide attempt between December 2002 and July 2013.<sup>9)</sup> The results showed that, compared with the mood disorder group, the schizophrenia group was significantly more likely to use highly lethal methods. Furthermore, within the schizophrenia group, suicide attempts motivated by hallucinations or delusions were significantly more likely to involve lethal methods (odds ratio: 3.36, 95% CI: 1.05–11.33). While long recognized clinically, our findings provide empirical evidence that acute exacerbation of psychotic symptoms in schizophrenia are associated with the use of highly lethal suicide methods.

## **II. Management of Severe Patients Transported to Emergency Departments Following Suicide Attempts**

### 1. Continuity of psychiatric care for patients in emergency settings

As mentioned earlier, a history of suicide-related behaviors including suicide attempts, remains the primary suicide risk factor. Even after achieving physical recovery, patients transported to emergency departments following a suicide attempt remain at a significant higher risk for repeated suicide attempts or self-harm compared to the general population, which in some cases leads to death by suicide. Therefore, from a suicide prevention perspective, psychiatric care is required to provide appropriate interventions and ongoing treatment for patients admitted to emergency departments following suicide attempts. While there is a high prevalence of underlying mental health conditions, particularly depression, among individuals who attempt suicide, it is essential to recognize that suicide attempts result from multiple, interacting factors. Consequently, treating mental illness alone is insufficient to prevent recurrent suicidal behavior. To effectively prevent such recurrences, it is crucial to assess the psychological processes that led each individual to the attempt, evaluate both risk and protective factors, and implement strategies to mitigate risks while strengthening protective factors.<sup>13)</sup>

To develop interventions that aim to prevent recurrent suicide attempts, a study titled “Assertive case management versus enhanced usual care for people with mental health problems who had attempted suicide and were admitted to hospital emergency departments in Japan (ACTION-J)”<sup>10)</sup> was conducted in 2005. This study provided high-level evidence that continuous and assertive case management intervention is effective in preventing recurrent suicide attempts. In 2016, the methodology developed in this study was officially incorporated into the national medical fee schedule as “Psychiatric Continuous Support Fee for Emergency Patients.”

The fundamental concept and content of this “Psychiatric Continuous Support Fee for Emergency Patients” evaluates the provision of continuous case management by a psychiatric liaison team—including psychiatrists, nurses, and mental health social workers—for individuals brought to the emergency department after suicide attempt. The case management program includes identifying and advising on challenges in daily life and ensuring the continuity of mental health treatment. For hospitalized patients, it can be billed once per month within six months from the date of admission. After discharge, it can be billed up to a maximum of six times in total. Facility standards are

established, meeting the requirement for the “Psychiatric Liaison Team Fee,” as well as the positioning of psychiatrists, nurses, and mental health social workers who have completed specialized training in patient information collection, patient psychoeducation, and case management practice<sup>12)</sup>. The number of trained professionals has increased annually, and case management for patients after suicide attempts is now implemented in many facilities across Japan.

## 2. Actual psychiatric care and ongoing support

Figure 1 shows the flow of psychiatric care provided to patients who have attempted suicide attempters after they are brought to the emergency department. When a patient is admitted to the advanced critical care and emergency center, a system is in place to ensure the psychiatrist in charge is contacted within 12 hours. The psychiatric liaison team then promptly begin gathering information and conduct an examination as soon as the patient is able to communicate. Psychiatric care involves assessing the mental health condition and suicidal ideation and proceeding with appropriate treatment. Concurrently, the case management is initiated as early as possible. To facilitate this, a case manager (mental health social

worker or psychiatric liaison nurse) accompanies the psychiatrist during the initial examination. Early in the intervention period, psychoeducation regarding the prevention of recurrent attempts is provided for the patient and key support persons using designated materials. During regular case management interviews, assessments are conducted on: (i) current suicidal ideation, risk factors, and the urgency of recurrent suicidal behavior, (ii) adherence to psychiatric and other necessary medical appointments, (iii) difficulties in daily life, and (iv) utilization of social resources. Regarding (iii), problem-solving plans are developed for each specific area. Planning and implementation fundamentally aim to enable the patient to think and act autonomously, with the case manager serving solely in a supportive role. Regular interviews continue post-discharge, with the goal of maintaining case management for 6 months following the initial intervention. The intervention concludes once the individuals successfully transition to a local support system of medical and social resources, ensuring that appropriate responses are available should they face a future crisis.

## III. Status of Individuals Transported Following Suicide Attempts to Our Facility Over the Past Five Years

## 1. Characteristics of individuals transported following suicide attempts

Our facility is a general hospital located in central Sapporo, with 30 medical departments and 922 beds. It operates the only advanced critical care and emergency center in Hokkaido, Japan, and serves as the regional tertiary emergency care provider. The department of neuropsychiatry at our facility is one of the few general-hospital-based psychiatric inpatient units in Sapporo. Consequently, patients admitted following suicide attempts are primarily those with severe physical conditions.

Figure 2 shows the trend in the number of patients admitted following suicide attempts from 2016 to 2020. More than half of the admitted cases resulted in death by suicide. The average suicide rate in Hokkaido from 2016 to 2020 was 17.2 per 100,000 population, remaining stable with no significant increase or decrease.<sup>8)</sup> While fluctuations were observed in the number of individuals admitted to our facility after suicide attempts, these were not due to changes in regional suicide rates; factors specific to the facility likely influenced this variation. Table 1 shows a comparison of age and sex between fatal and non-fatal cases. Consistent with previous reports, the rate of suicide death was significantly higher among males, whereas the rate

of non-fatal cases was significantly higher among females. In both sexes, suicide death tended to occur at older ages compared to non-fatal cases; notably, this age discrepancy was significantly more pronounced in females. Regarding the methods used in suicide attempts, hanging was the most frequent among fatal cases in both sexes. Additionally, medication overdose was more frequent among females (Table 2). All patients admitted following suicide attempts were examined by psychiatrists. Figure 3 shows the psychiatric diagnoses among the 166 patients. Cases where the diagnosis was unknown (not meeting criteria for a mental illness, or diagnosis deferred) accounted for 3% of the total, meaning nearly all cases met the diagnostic criteria for a mental disorder according to the ICD-10. The most common diagnosis for both sexes was F3 (mood disorder), accounting for 42% of all diagnoses. A sex difference was observed: 32% of males versus 49% of females, indicating a higher rate in females. The second most common was F4 (neurotic, stress-related, and somatoform disorders), accounting for 26% of cases. Here too, a sex difference was noted: 37% of males versus 19% of females, with males showing a higher rate. Among those diagnosed with F4, a large number of cases for both sexes involved adjustment disorders. While

adjustment disorder is often dismissed as a mild condition, its high prevalence among individuals who attempt suicide using highly lethal methods warrants serious attention.

## 2. Our facility's approach to ongoing support for suicide attempt survivors

Our facility provides continuous assertive case management interventions modeled after the ACTION-J study for patients admitted to our critical care and emergency center following suicidal behavior. This approach aims to prevent recurrent suicide attempts.

Between 2016 and 2020, assertive case management interventions were implemented for 58 of the 166 patients admitted to the center following a suicide attempt. The primary reasons for not initiating the intervention included the severity of the patient's physical condition, explicit refusal by the patient, or immediate transfer to a distant facility. Among the 58 patients, 26 were male and 32 were female, with a mean age of  $43.1 \pm 22.8$  years. The participants spanned a wide age range, from 14 to 93 years, demonstrating the broad applicability of the intervention across different life stages. Regarding psychiatric diagnosis, mood disorders were the most frequent diagnosis, accounting for 37.9% of the patients. The most common methods of suicide

attempts in this group were jumping from heights, followed by medication overdose. While mental health conditions were the most frequent underlying factor for suicide attempts, interpersonal relationships, particularly family-related issues, were also identified as significant contributors to the attempts. In terms of intervention outcomes, as of September 1, 2021, 44 patients (80%) successfully completed the full 6-month period of regular case management interviews (excluding 3 patients who were still undergoing the intervention at the time of analysis). The intervention was discontinued for 11 patients (20%). Primary reasons for discontinuation included patient refusal, transfer to distant facilities, or consciousness impairment resulting from carbon monoxide poisoning. At the 6 months follow-up, although self-harm behavior was observed in 2 individuals (3.6%), no recurrent suicide attempts were identified among any of the participants.

## Conclusion

This paper outlines the clinical characteristics of individuals admitted to the critical care and emergency center following serious suicide attempts, alongside the details of our assertive case management interventions. The continuous assertive case management intervention

developed in the ACTION-J study has demonstrated high-level evidence for its effectiveness in preventing recurrent suicide attempts. This study further demonstrates that such interventions are feasible even in a facility like ours, which frequently manages critically injured individuals following suicide attempts. We intend to expand our case series and continue advancing our research in this field.

Editor's Note: This special feature article is based on the symposium held at the 117th Annual Meeting of the Japanese Society of Psychiatry and Neurology, with Hisatoshi Arai (Department of Psychiatry, Saitama Medical University) as the representative.

There are no conflicts of interest to disclose related to this paper.

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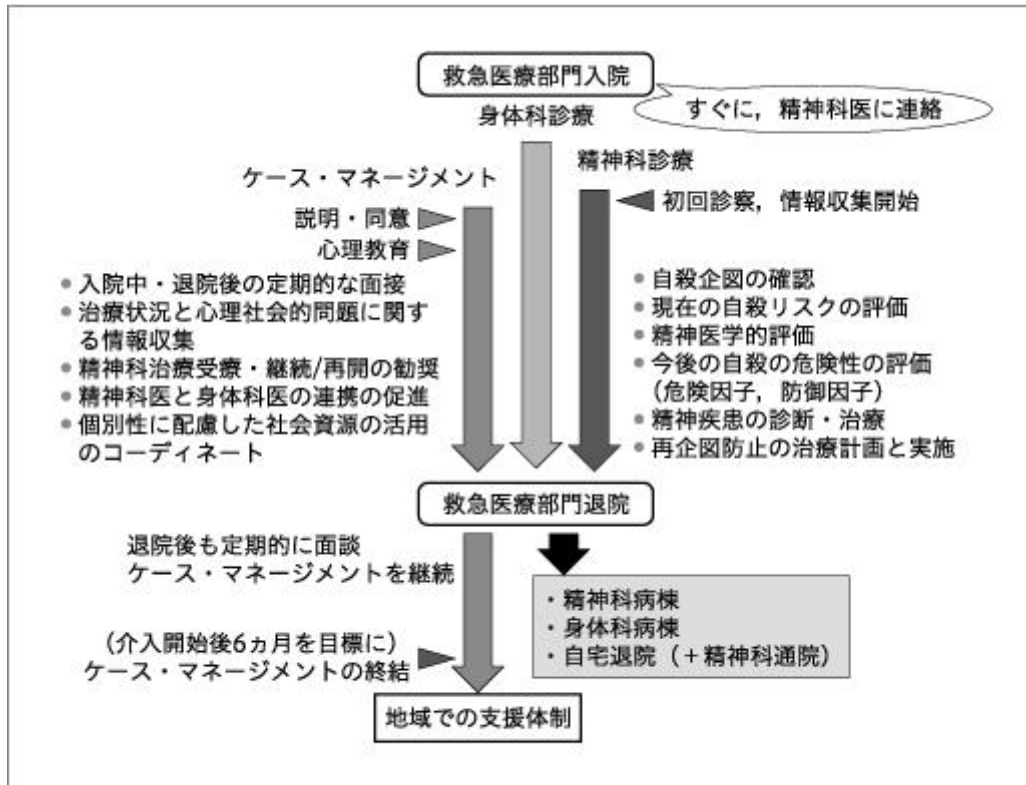


図 1 自殺企図患者が救急医療部門に搬入されてからの精神科での診療の流れ

Figure 1: Flow of psychiatric care for individuals admitted to the emergency medical department following suicide attempts

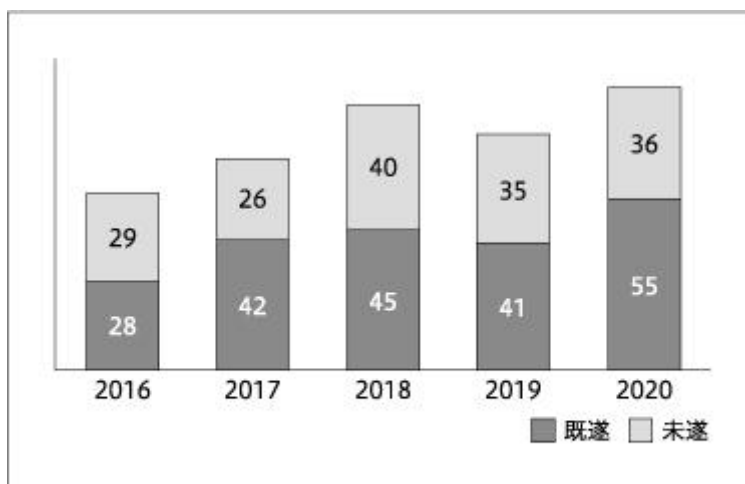


図 2 札幌医科大学附属病院に搬入された自殺企図患者の過去 5 年間の年度推移 (人)

Figure 2: Annual trends in patients transported to Sapporo Medical University Hospital following suicide attempts over the past 5 years (number of people)

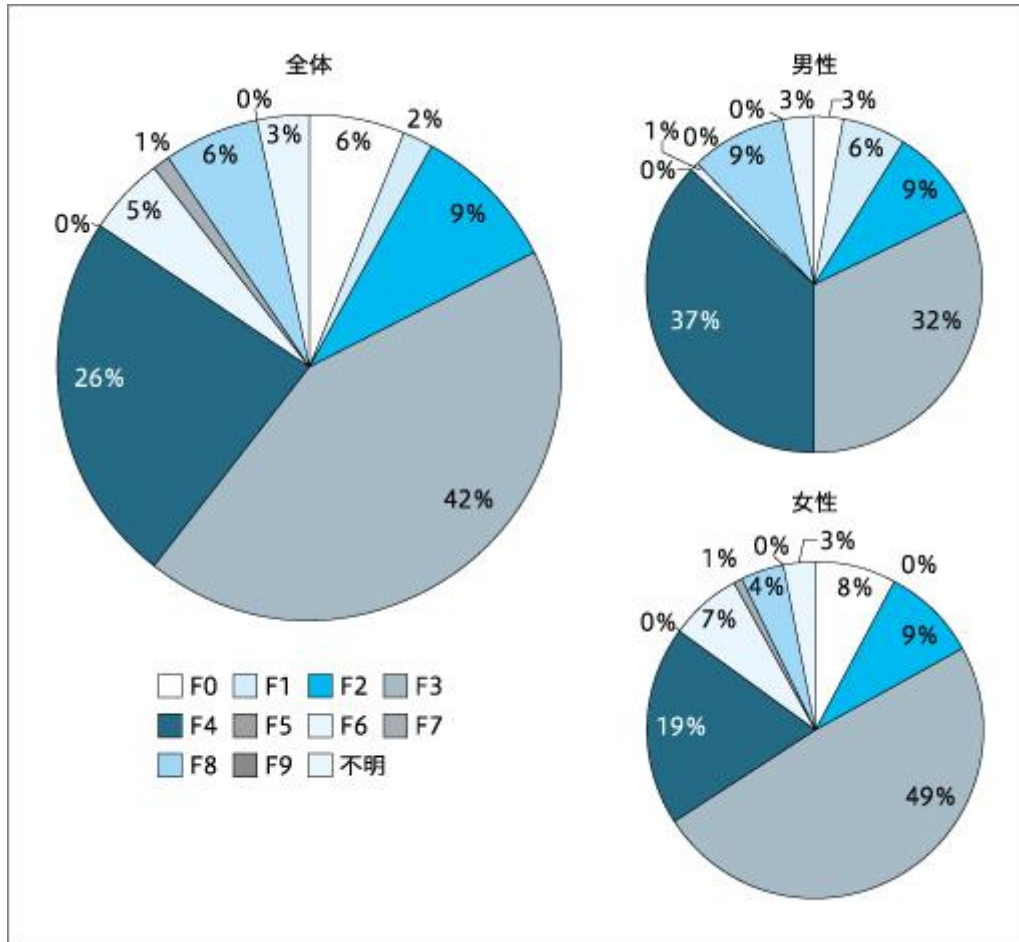


図3 札幌医科大学附属病院に搬入された自殺企図患者の精神科診断 (ICD-10)

Figure 3: Psychiatric diagnoses (ICD-10) of patients transported to Sapporo Medical University Hospital following suicide attempts

表1 札幌医科大学附属病院に搬入された自殺企図患者の性別と年齢

	自殺未遂	自殺既遂	P値
性別 (人)			
男性	68	111	$P < 0.05^*$
女性	98	100	
年齢 (平均 ± 標準偏差)			
男性	45 ± 21.7	48.9 ± 10.3	n.s.**
女性	42.7 ± 20.7	52.5 ± 19.7	$P < 0.01^{**}$

\* $\chi^2$ 検定, \*\*t検定

Table 1: Sex and age of patients transported to Sapporo Medical University Hospital following suicide attempts

Suicide attempts	Completed suicides	P-value
Sex (persons)		
Male	68    111	$P < 0.05^*$
Female	98    100	
Age (Mean ± Standard deviation)		
Male	45 ± 21.7    48.9 ± 10.3	n.s.**
Female	42.7 ± 20.7    52.5 ± 19.7	$P < 0.01^{**}$

\* $\chi^2$  test, \*\* t-test

表2 札幌医科大学附属病院に搬入された自殺企図患者の自殺企図手段

	縊頭	高所墜落	毒物	医薬品	刃器	ガス	その他	合計
男性 未遂 (%)	9 (13.2)	18 (26.5)	4 (5.9)	7 (10.3)	10 (14.7)	12 (17.6)	8 (11.8)	68 (100)
既遂 (%)	73 (65.8)	28 (25.2)	2 (1.8)	0 (0)	1 (0.9)	6 (5.4)	1 (0.9)	111 (100)
合計 (%)	82 (45.8)	46 (25.7)	6 (3.4)	7 (3.9)	11 (6.1)	18 (10.1)	9 (5.0)	179 (100)
女性 未遂 (%)	12 (12.2)	31 (31.6)	4 (4.1)	31 (31.6)	7 (7.1)	5 (5.1)	8 (8.2)	98 (100)
既遂 (%)	59 (59.0)	25 (25.0)	1 (1.0)	8 (8.0)	2 (2.0)	4 (4.0)	1 (1.0)	100 (100)
合計 (%)	71 (35.9)	56 (28.3)	5 (2.5)	39 (19.7)	9 (4.5)	9 (4.5)	9 (4.5)	198 (100)
全体 未遂 (%)	21 (12.7)	49 (29.5)	8 (4.8)	38 (22.9)	17 (10.2)	17 (10.2)	16 (9.6)	166 (100)
既遂 (%)	132 (62.6)	53 (25.1)	3 (1.4)	8 (3.8)	3 (1.4)	10 (4.7)	2 (0.9)	211 (100)

Table 2: Suicide methods among suicide attempters transported to Sapporo Medical University Hospital

Hanging/Jumping from high places/Poison/Medication/Sharp objects/Gas/Others/  
Total

Male

Attempted (%)

9 (13.2)/18 (26.5)/ 4 (5.9)/7 (10.3)/10 (14.7)/12 (17.6)/8 (11.8)/68 (100)

Completed (%)

73 (65.8)/28 (25.2)/2 (1.8)/0 (0)/1 (0.9)/6 (5.4)/1 (0.9)/111 (100)

Total (%)

82 (45.8)/46 (25.7)/6 (3.4)/7 (3.9)/11 (6.1)/18 (10.1)/9 (5.0)/179 (100)

Female

Attempted (%)

12 (12.2)/31 (31.6)/4 (4.1)/31 (31.6)/7 (7.1)/5 (5.1)/8 (8.2)/98 (100)

Completed (%)

59 (59.0)/25 (25.0)/1 (1.0)/8 (8.0)/2 (2.0)/4 (4.0)/1 (1.0)/100 (100)

Total (%)

71 (35.9)/56 (28.3)/5 (2.5)/39 (19.7)/9 (4.5)/9 (4.5)/9 (4.5)/198 (100)

Total

Attempted (%)

21 (12.7)/49 (29.5)/8 (4.8)/38 (22.9)/17 (10.2)/17 (10.2)/16 (9.6)/166 (100)

Completed (%)

132 (62.6)/53 (25.1)/3 (1.4)/8 (3.8)/3 (1.4)/10 (4.7)/2 (0.9)/211 (100)