CHAPTER V

RESULTS OF THE STUDY

There were 180 patients enrolled in this study, 45 in each group. The data were collected during the period of 7th June, 1994 to 13th December, 1994. The demographic data (age, body weight, height and body mass index) and baseline laboratory data (hemoglobin concentration, hematocrit, blood urea nitrogen, serum creatinine and electrolytes) were shown in Table 5.1 and Table 5.2 respectively. There was no statistical difference in all these variables among all 4 groups of patients. All the patients were females scheduled for gynecological operation such as total hysterectomy, oophorectomy, tuboplasty as shown in Table 5.3. There was no statistical difference in types and duration of operations among all these 4 groups.

The $\%T_4/T_1$ ratios at 30 min. were 54.3 ± 26.0, 61.3 ± 24.2, 76.4 ± 20.3 and 88.2 ± 23.1 respectively as shown in Table 5.4. The differences in these ratios among groups of patients were statistically significant. The differences were explained by the difference in the types of muscle relaxants used (pancuronium or vecuronium), but not by whether or not the PNS was used

or by the interaction between the types of muscle relaxants and whether or not the PNS was used. Seventy percent is the cut-off point of $\%T_4/T_1$ ratio for the diagnosis of residual relaxation. It is of interest to see that the ratios in those who received pancuronium were less than 70%, while for those who received vecuronium were more than 70%.

The number (26, 24, 12 and 8) and the prevalence rates of residual relaxation at 30 min. (57.8%, 53.3%, 26.7% and 17.8%) in the 4 groups were shown in Table 5.5, Fig. 5.1 and Fig.5.2. There was a statistically significant difference among these four groups of patients (p = 0.00007). Univariate and subgroup analyses were shown and summarized in Table 5.6, 5.7, 5.8, 5.9, 5.10 and 5.11. The type of relaxants used was a significant factor that affected the prevalence rates of residual relaxation at 30 min., while whether or not the PNS was used and the interaction between these two factors were not significant factors. The difference in types of relaxants affected the prevalence of residual relaxation in both subgroups of patients to whom the PNS was used or not used as shown in Fig. 5.1. The effect of using PNS was not large in both subgroups of patients who received different types of relaxants as shown in Fig. 5.2. There was no or very small interaction effect as

both lines in Fig. 5.1 and 5.2 were parallel or nearly parallel to each other. The crude relative risk of using pancuronium instead of vecuronium was 2.5 and 95% C.I. was 1.63 - 3.83 which meant that the relative risk was different from 1.0.

The summary of the result of multivariate analysis using backward elimination hierarchical log linear model is shown below and the final model shows that the residual relaxation at 30 min. (RR30) was dependent on the types of relaxant used and was not related to whether or not the PNS was used.

```
H I E R A R C H I C A L    L O G    L I N E A R
DESIGN 1 has generating class
    RR30*MR*PNS

Goodness-of-fit test statistics
    LR chi square       =  0.00000  DF = 0  P = 1.000
    Pearson chi square =  0.00000  DF = 0  P = 1.000

Tests that K-way and higher order effects are zero.
K  DF  L.R. Chisq   Prob    Pearson Chisq   Prob
3 .1     0.260     0.6102       0.259       0.6108
2  4    22.783     0.0001      21.974       0.0002
1  7    31.747     0.0000      29.778       0.0001

Backward Elimination (p = .050)
  RR30*MR*PNS
 Likelihood ratio chi square = .00000    DF = 0  P = 1.000
If Deleted Simple Effect is L.R. Chisq Change  DF     Prob
 RR30*MR*PNS                       .260                1   0.6102

Step 1
  The best model has generating class
       RR30*MR
       RR30*PNS
       MR*PNS
  Likelihood ratio chi square = .25984 DF = 1 P =  .610
If Deleted Simple Effect is L.R. Chisq Change  DF     Prob
 RR30*MR                          21.681               1    .0000
```

RR30*PNS	.954	1 .3286
MR*PNS	.112	1 .7379

Step 2
  The best model has generating class
      RR30*MR
      RR30*PNS
  Likelihood ratio chi square = .37183 DF = 2 P = .830
If Deleted Simple Effect is L.R. Chisq Change   DF   Prob
 RR30*MR   21.569   1   .0000
 RR30*PNS   .842   1   .3587

Step 3
  The best model has generating class
      RR30*MR
      PNS
  Likelihood ratio chi square = 1.21418 DF = 3 P = .750
If Deleted Simple Effect is L.R. Chisq Change   DF   Prob
 RR30*MR   21.569   1   .0000
 PNS   .000   1 1.0000

Step 4
  The best model has generating class
      RR30*MR
  Likelihood ratio chi square = 1.21418 DF = 4 P = .876
If Deleted Simple Effect is L.R. Chisq Change   DF   Prob
 RR30*MR   21.569   1   .0000

Step 5
  The best model has generating class
      RR30*MR
  Likelihood ratio chi square = 1.21418 DF = 4 P = .876
The final model has generating class
   RR30*MR
Goodness-of-fit test statistics
  Likelihood ratio chi square = 1.21418   DF = 4   P = .876

The recovery times (time to T_4/T_1 ratio of 70%) of the four groups were shown in Table 5.12 (57.2 ± 38.0, 44.0 ± 26.0, 30.1 ± 20.4 and 23.2 ± 20.6 min. respectively). These were significantly different (p = 0.000) and could be explained by both the difference in types of relaxants and whether or not the PNS was used (p

= 0.000 and 0.014 respectively). There was no interaction effect of these two factors on the recovery time (p = 0.436).

However, the times from reversal of muscle relaxants to extubation were not statistically different among the four groups as shown in Table 5.13.

The total amounts and amounts per body weight per hour of relaxants used were shown in Table 5.14 and 5.15 respectively. These amounts of relaxant used were significantly different between the groups of patients who received different types of relaxants. The use of PNS did not affect the amounts of relaxants used.

The average total cost of muscle relaxants and total cost of relaxant/hour for each group of patients were shown in Table 5.16 and there was a significant difference among all four groups (p = 0.0000). The difference was tested further and was shown to be the difference between groups that received pancuronium and groups that received vecuronium, but no difference was caused by whether or not the PNS was used.

All the complications were summarized in Table 5.17. The most common complication was restless (10 cases - 5.6%). Eight out of these ten patients described that these were because of postoperative pain. However,

two of these patients said that these were because they felt it was difficult to cough. Both patients had $\%T_4/T_1$ ratios much less than 70%, and one of these two patients had transient drop in oxygen saturation that responded to more reversal drug.

In three patients there were sign of mild airway obstructions when they were asleep and were better when they were awake. All these patients had $\%T_4/T_1$ ratios at 30 min. higher than 70% while they still had sign of airway obstruction during asleep. One of these patients had history of thyroidectomy about 20 years ago and during intubation for the operation, she required a smaller than normal size endotracheal tube.

	Group I (mean ± S.D.) (range)	Group II (mean ± S.D.) (range)	Group III (mean ± S.D.) (range)	Group IV (mean ± S.D.) (range)	p values
Age (yr.)	40.6 ± 6.9 (24.1 - 58.0)	39.7 ± 7.1 (25.5 - 52.0)	38.9 ± 8.8 (22.4 - 60.0)	39.4 ± 6.3 (25.2 - 52.3)	0.7624
Body weight (kg.)	55.7 ± 9.2 (38.0 - 82.0)	54.1 ± 8.7 (41.0 - 75.0)	55.2 ± 7.9 (38.0 - 71.0)	57.6 ± 12.5 (40.0 - 96.0)	0.3886
Height (cm.)	154.1 ± 4.8 (145.0 - 164.0)	154.5 ± 5.4 (144.0 - 167.0)	155.8 ± 6.2 (140.0 - 167.0)	154.9 ± 5.1 (145.0 - 167.0)	0.5386
Body mass index (kg./m^2)	23.6 ± 3.7 15.8 - 32.0)	22.7 ± 3.6 (16.4 - 31.2)	23.0 ± 3.3 (16.7 - 31.4)	24.1 ± 5.2 (16.3 - 42.7)	0.3806

Table 5.1   This table shows the demographic data of the patients.   There were no statistically significant differences in age, body weight, height and body mass index among the four groups.

	Group I (mean ± S.D.) (range)	Group II (mean ± S.D.) (range)	Group III (mean ± S.D.) (range)	Group IV (mean ± S.D.) (range)	p values
Hemoglobin (gm%)	12.5 ± 1.3 (9.0 - 14.7)	12.0 ± 1.3 (8.9 - 15.2)	12.1 ± 1.4 (9.3 - 14.9)	12.2 ± 1.6 (9.2 - 15.7)	0.4920
Hematocrit (%)	38.7 ± 3.5 (31.0 - 45.0)	37.6 ± 3.4 (30.0 - 45.0)	37.3 ± 3.8 (28.0 - 45.1)	38.0 ± 4.4 (29.0 - 47.5)	0.3567
BUN (mg%)	10.9 ± 3.9 (5.0 - 21.0)	11.5 ± 3.2 (5.0 - 17.0)	11.1 ± 3.3 (5.0 - 20.0)	11.0 ± 3.5 (5.0 - 20.0)	0.8294
Creatinine (mg%)	0.88 ± 0.09 (0.70 - 1.10)	0.85 ± 0.21 (0.1 - 1.2)	0.85 ± 0.11 (0.5 - 1.0)	0.89 ± 0.20 (0.30 - 1.50)	0.4142
Sodium (mEq/l)	143.1 ± 2.7 (137.0 - 150.0)	142.0 ± 3.0 (138.0 - 149.0)	143.3 ± 2.6 (138.0 - 149.0)	143.0 ± 2.1 (137.0 - 148.0)	0.0810
Potassium (mEq/l)	4.2 ± 0.5 (3.0 - 5.2)	4.3 ± 0.4 (3.7 - 5.2)	4.1 ± 0.4 (3.0 - 5.0)	4.2 ± 0.4 (3.3 - 5.2)	0.3124
Bicarbonate (mEq/l)	24.0 ± 2.4 (19.0 - 31.0)	24.2 ± 2.8 (20.0 - 34.0)	23.7 ± 2.5 (18.0 - 29.0)	24.0 ± 2.4 (19.0 - 29.0)	0.8203
Chloride (mEq/l)	107.2 ± 2.9 (99.0 - 113.0)	106.8 ± 2.9 (99.0 115.0)	107.4 ± 3.1 (98.0 - 115.0)	107.1 ± 2.4 (102.0 - 114.0)	0.7484

Table 5.2   This table shows the baseline laboratory data of the patients.   There were no statistical differences in hemoglobin, hematocrit, blood urea nitrogen (BUN), serum creatinine and serum electrolytes (sodium, potassium, bicarbonate and chloride) among the four groups.

	Group I number (%)	Group II number (%)	Group III number (%)	Group IV number (%)	p values
ASA status					
Class I (No systemic disease)	40 (88.9%)	41 (91.1%))	40 (88.9%)	38 (84.4%)	0.7954
Class II (Mild to moderate systemic disease)	5 (11.1%)	4 (8.9%)	5 (11.1%)	7 (15.6%)	
Types of operation					
- Abdominal hysterectomy with or without oophorectomy	33 (73.3%)	36 (80.0%)	32 (71.1%)	37 (82.2%)	0.2582
- Oophorectomy	8 (17.8%)	2 (4.4%)	4 (8.9%)	3 (6.7%)	
- Other operation, e.g., tuboplasty, Wertheim's operation, appendicectomy	4 (8.9%)	7 (15.6%)	9 (10.2%)	5 (11.1%)	
Duration of operation (min.) (mean ± S.D., range)	126.6 ± 38.1 (70 - 269)	135.2 ± 45.6 (75 - 305)	124.4 ± 34.9 (70 -230)	132.1 ± 46.4 (60 - 370)	0.5925

Table 5.3   This table shows the general conditions of the patients, types of operation and duration of operations.   There were no statistical differences in any of these variables among the four groups.

	Group I (mean ± S.D.) (range)	Group II (mean ± S.D.) (range)	Group III (mean ± S.D.) (range)	Group IV (mean ± S.D.) (range)
% T4/T1 at 30 min (AC30)	54.3 ± 26.0 (0.0 - 100.0)	61.3 ± 24.2 (0.0 - 100.0)	76.4 ± 20.3 (23.0 - 100.0)	88.2 ± 23.1 (0.0 - 100.0)

* * * * * *A n a l y s i s   o f   V a r i a n c e * * * * * *

Tests of Significance for AC30 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN+RESIDUAL	97002.18	176	551.15		
MR	21407.61	1	21407.61	38.84	0.000
PNS	2006.67	1	2006.67	3.64	0.058
MR BY PNS	2.94	1	2.94	0.01	0.942
(Model)	23417.22	3	7805.74	14.16	0.000
(Total)	120419.39	179	672.73		

R-Squared =   0.194
Adjusted R-Squared = 0.181

Table   5.4   This table shows the %T4/T1 at 30 min. and the result of the analysis of variance.   There was a statistically significant difference in %T4/T1 at 30 min. which was explained by the difference in the types of muscle relaxants (pancuronium or vecuronium) but   not   by   whether   or   not   the   PNS   was   used.   -   There   was   no   significant   difference explained by the interaction term.

```
                      RR30            Page 1 of 1
                      |Residual relaxation at 30 min.
                      |NO          YES
            Count     |
            Row Pct   |      0  |       1  | Total
GR                    --------+---------+---------+
                 1  |     19  |      26  |     45
   Panc without PNS  |   42.2  |    57.8  |   25.0
                    +---------+---------+
                 2  |     21  |      24  |     45
   Panc with PNS     |   46.7  |    53.3  |   25.0
                    +---------+---------+
                 3  |     33  |      12  |     45
   Vec without PNS   |   73.3  |    26.7  |   25.0
                    +---------+---------+
                 4  |     37  |       8  |     45
   Vec with PNS      |   82.2  |    17.8  |   25.0
                    +---------+---------+
            Column       110         70        180
            Total       61.1       38.9      100.0
```

Chi-Square	Value	DF	Significance
Pearson	21.97403	3	0.00007

Table 5.5   This table shows the numbers (26, 24, 12 and 8) and the prevalence rates (57.8%, 53.3%, 26.7% and 17.8%) of residual relaxation at 30 min. in all patients. There was a statistically significant difference among these four groups of patients (p = 0.00007).

```
                          Residual relaxation at 30 min
                  Count  |
                  Row Pct |NO          YES
                  Col Pct |                      Row
                  Tot Pct |      0  |      1  | Total
      PNS          --------+--------+--------+
                  0 |     52  |     38  |     90
      PNS not used     |   57.8  |   42.2  |   50.0
                       |   47.3  |   54.3  |
                       |   28.9  |   21.1  |
                       +--------+--------+
                  1 |     58  |     32  |     90
      PNS used         |   64.4  |   35.6  |   50.0
                       |   52.7  |   45.7  |
                       |   32.2  |   17.8  |
                       +--------+--------+
               Column     110        70       180
                Total    61.1      38.9     100.0
```

Chi-Square	Value	DF	Significance
Pearson	0.84156	1	0.35895
Continuity Correction	0.58442	1	0.44459

Table 5.6 This table shows the numbers (38 and 32) and prevalence rates (42.2% and 35.6%) of residual relaxation in the groups that PNS was not used and used respectively. There was no statistical significant difference between these two groups of patients (p = 0.44459) and the relative risk in the group that PNS was not used in comparison to the group that PNS was used was 1.18750 (95% C.I. = 0.82150 - 1.71656).

PNS by RR30 Controlling for MR - Pancuronium used

```
                     Residual relaxation at 30 min.
                    |NO    (0) YES  (1)  Total
      PNS    --------+--------+--------+
      Not used   (0)|   19   |   26   |    45
                    +--------+--------+
      Used       (1)|   21   |   24   |    45
                    +--------+--------+
              Total       40        50        90
```

Chi-Square	Value	DF	Significance
Pearson	0.18000	1	0.67137
Continuity Correction	0.04500	1	0.83200

Statistic	Value	95% Confidence Bounds
Relative Risk Estimate (PNS0/PNS1): (RR30=1 Risk)		
	1.08333	(0.74812 - 1.56876)

Table 5.7 This table shows subgroup analysis in the patients who received pancuronium, comparing between when PNS was not used and was used. There was no statistically significant difference in residual relaxation.

PNS by RR30 Controlling for MR - Vecuronium used

```
                      Residual relaxation at 30 min.
                      |NO  (0)   YES (1)   Total
     PNS     --------+--------+--------+
       Not used   (0)|   33   |   12   |    45
                     +--------+--------+
       Used       (1)|   37   |    8   |    45
                     +--------+--------+
              Total       70       20        90
```

Chi-Square	Value	DF	Significance
Pearson	1.02857	1	0.31049
Continuity Correction	0.57857	1	0.44687

Statistic	Value	95% Confidence Bounds
Relative Risk Estimate (PNS0/PNS1): (RR30 = 1 Risk)		
	1.50000	(0.67842 - 3.31654)

<u>Table 5.8</u> This table shows subgroup analysis in the patients who received vecuronium, comparing between when PNS was not used and was used. There was no statistically significant difference in residual relaxation.

```
                          Residual relaxation at 30 min
            Count  |
            Row Pct |NO           YES
            Col Pct |                          Row
            Tot Pct |      0  |       1  | Total
   MR       --------+--------+--------+
              0  |     40  |     50  |     90
   Pancuronium     |   44.4  |   55.6  |   50.0
                   |   36.4  |   71.4  |
                   |   22.2  |   27.8  |
                   +--------+--------+
              1  |     70  |     20  |     90
   Vecuronium      |   77.8  |   22.2  |   50.0
                   |   63.6  |   28.6  |
                   |   38.9  |   11.1  |
                   +--------+--------+
            Column     110       70       180
            Total     61.1      38.9     100.0
```

Chi-Square	Value	DF	Significance
Pearson	21.03896	1	0.00000
Continuity Correction	19.65974	1	0.00001

Table 5.9 This table shows the numbers (50 and 20) and prevalence rates (55.6% and 22.2%) of residual relaxation in the groups that pancuronium and vecuronium were used respectively. There was a statistically significant difference between these two groups of patients (p = 0.00001) and the relative risk in pancuronium group in comparison to vecuronium group was 2.50000 (95% C.I. = 1.62886 - 3.83704).

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MR by RR30 Controlling for PNS - PNS not used

```
                     Residual relaxation at 30 min.
                    |NO    (0) YES  (1)  Total
     MR        ---------+---------+---------+
       Pancuronium (0)|    19   |    26   |    45
                      +---------+---------+
       Vecuronium  (1)|    33   |    12   |    45
                      +---------+---------+
               Total       52        38       90
```

Chi-Square	Value	DF	Significance
Pearson	8.92713	1	0.00281
Continuity Correction	7.69737	1	0.00553

Statistic	Value	95% Confidence Bounds
Relative Risk Estimate (MR0/MR1): (RR30=1 Risk)		
	2.16667	(1.25619 - 3.73704)

Table 5.10 This table shows the subgroup analysis in patients when PNS was not used, comparing between the two muscle relaxants. There was a statistically significant difference in residual relaxation, between patients who received pancuronium and vecuronium.

MR by RR30 Controlling for PNS - PNS used

```
                        Residual relaxation at 30 min.
                    |NO  (0)   YES (1)    Total
    MR      --------+--------+--------+
      Pancuronium (0)|    21  |    24  |     45
              +--------+--------+
      Vecuronium  (1)|    37  |     8  |     45
              +--------+--------+
              Toatl       58       32        90
```

```
Chi-Square                   Value    DF  Significance
------------------------------------------------------
Pearson                    12.41379   1       0.00043
Continuity Correction      10.91056   1       0.00096


Statistic           Value         95% Confidence Bounds
------------------------------------------------------
Relative Risk Estimate (MR0/MR1): (RR30 = 1 Risk)
                 3.00000        (1.51195  -  5.95256)
```

Table 5.11 This table shows subgroup analysis in patients when PNS was used, comparing between the two muscle relaxants.   There was a statistically significant difference in residual relaxation between patients who received pancuronium and vecuronium.   The summary or crude relative risk (when combined Table 5.9 and 5.10) equaled 2.50 (95% C.I. = 1.63 - 3.83)

M-H Summary Chi Square = 19.53
p value = 0.00000989

WOOLF'S TEST FOR HETEROGENEITY OF ODDS RATIOS
Woolf's Chi Square = 0.26
p value = 0.61095526
Test does not suggest multiplicative interaction.

	Group I (mean ± S.D.) (range)	Group II (mean ± S.D.) (range)	Group III (mean ± S.D.) (range)	Group IV (mean ± S.D.) (range)
Time to 70% T4/T1	57.2 ± 38.0	44.0 ± 26.0	30.1 ± 20.4	23.2 ± 20.6
(min)	(5.0 - 165.0)	(15.0 - 125.0)	(5.0 - 80.0)	(5.0 - 85.0)

* * * * * * A n a l y s i s   o f   V a r i a n c e * * * * * *

Tests of Significance for TIME70 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN+RESIDUAL	130390.00	176	740.85		
MR	25800.14	1	25800.14	34.82	0.000
PNS	4550.14	1	4550.14	6.14	0.014
MR BY PNS	451.25	1	451.25	0.61	0.436
(Model)	30801.53	3	10267.18	13.86	0.000
(Total)	161191.53	179	900.51		

R-Squared =   0.191
Adjusted R-Squared = 0.177

Table 5.12 This table shows the recovery time and the result of the analysis of variance.   There was a statistically significant difference in the recovery time which was explained by the difference in the types of muscle relaxants (pancuronium or vecuronium) and by whether or not the PNS was used.   There was no statistically significant difference explained by the interaction term.

	Group I (mean ± S.D.) (range)	Group II (mean ± S.D.) (range)	Group III (mean ± S.D.) (range)	Group IV (mean ± S.D.) (range)
Time to extubation	6.4 ± 3.7	6.0 ± 3.7	5.2 ± 2.8	5.6 ± 3.7
(min)	(1 -14)	(2 -20)	(2 - 13)	(1 - 15)

```
* * * * * * A n a l y s i s    o f    V a r i a n c e * * * * * * *
Tests of Significance for Time to extubation using UNIQUE sums of squares
Source of Variation              SS        DF        MS          F   Sig of F
WITHIN+RESIDUAL                2157.60     176      12.26
MR                               31.25       1      31.25      2.55    0.112
PNS                               0.01       1       0.01      0.00    0.983
MR BY PNS                         6.81       1       6.81      0.56    0.457
(Model)                          38.06       3      12.69      1.03    0.378
(Total)                        2195.66     179      12.27

R-Squared =            0.017
Adjusted R-Squared =   0.001
```

Table   5.13   This table shows the time to extubation and the result of the analysis of variance.   There was no statistically significant difference in the time to extubation.

Amount of relaxants used	Group I (mean ± S.D.) (range)	Group II (mean ± S.D.) (range)	Group III (mean ± S.D.) (range)	Group IV (mean ± S.D.) (range)
Total (mg.)	7.7 ± 1.8	7.4 ± 1.4	10.1 ± 2.0	10.9 ± 3.2
	(4.8 - 12.2)	(4.7 - 12.0)	(6.2 - 16.0)	(5.2 - 20.0)

* * * * * * Analysis of Variance * * * * * *

Tests of Significance for total amount using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN+RESIDUAL	844.00	176	4.80		
MR	398.13	1	398.13	83.02	0.000
PNS	3.23	1	3.23	0.67	0.413
MR BY PNS	12.64	1	12.64	2.64	0.106
(Model)	414.00	3	138.00	28.78	0.000
(Total)	1258.00	179	7.03		

R-Squared = 0.329
Adjusted R-Squared = 0.318

Table 5.14 This table shows the total amount of relaxants used in this study and the result of the analysis of variance. There was a statistically significant difference in the total amount of relaxants used which was explained by the difference in the types of muscle relaxants (pancuronium-vecuronium) but not by whether or not the PNS was used. There was no statistically significant difference explained by the interaction term.

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Amount of relaxants used	Group I (mean ± S.D.) (range)	Group II (mean ± S.D.) (range)	Group III (mean ± S.D.) (range)	Group IV (mean ± S.D.) (range)
Total amount/BW/Time (mg/kg/hr)	0.068 ± 0.013 (0.045 - 0.107)	0.065 ± 0.014 (0.040 - 0.099)	0.092 ± 0.013 (0.072 - 0.126)	0.091 ± 0.024 (0.040 - 0.197)

* * * * * * *A n a l y s i s   o f   V a r i a n c e * * * * * *

Tests of Significance for total amount/BW/Time using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN+RESIDUAL	0.05	176	0.00		
MR	0.03	1	0.03	100.11	0.000
PNS	0.00	1	0.00	0.70	0.404
MR BY PNS	0.00	1	0.00	0.24	0.623
(Model)	0.03	3	0.01	33.69	0.000
(Total)	0.08	179	0.00		

R-Squared =   0.365
Adjusted R-Squared = 0.354

Table 5.15 This table shows the total amount of relaxants used per body weight (kg) per time (hr) in this study and the result of the analysis of variance. There were statistically significant differences in the total amount of relaxants used which was explained by the difference in the types of muscle relaxants (pancuronium-vecuronium) but not by whether or not the PNS was used. There was no statistically significant difference explained by the interaction term.

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Cost of muscle relaxants (Baht)	Group I (mean ± S.D.)	Group II (mean ± S.D.)	Group III (mean ± S.D.)	Group IV (mean ± S.D.)
Cost per mg.	7.75	7.75	11.40	11.40
Total cost	59.30 ± 13.58*	57.26 ± 10.70*	115.09 ± 22.32*	124.18 ± 38.72*
Total cost of relaxant/hr	29.08 ± 5.90*	27.00 ± 6.72*	57.76 ± 12.17*	58.57 ± 15.24*

* $p = 0.0000$

(*) Indicates significant differences

```
                        G G G G
                        r r r r
                        p p p p
                        2 1 3 4
            GR
            Grp 2
            Grp 1
            Grp 3        * *
            Grp 4        * *
```

Table 5.16   This table shows the cost per mg., total cost of relaxant and total cost of relaxant/hour used in this study.   The total cost and the total cost/hour when using vecuronium were significantly higher than using pancuronium.

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Complications	Group I	Group II	Group III	Group IV	Total
Restless	3	3	2	2	10
Difficult to cough	0	1	1	0	2
Required more reversal drug	0	0	1	0	1
Hypoxia	0	0	1	0	1
Airway obstruction	0	1	2	0	3

Table 5.17   This table shows the summary of complications in this study.

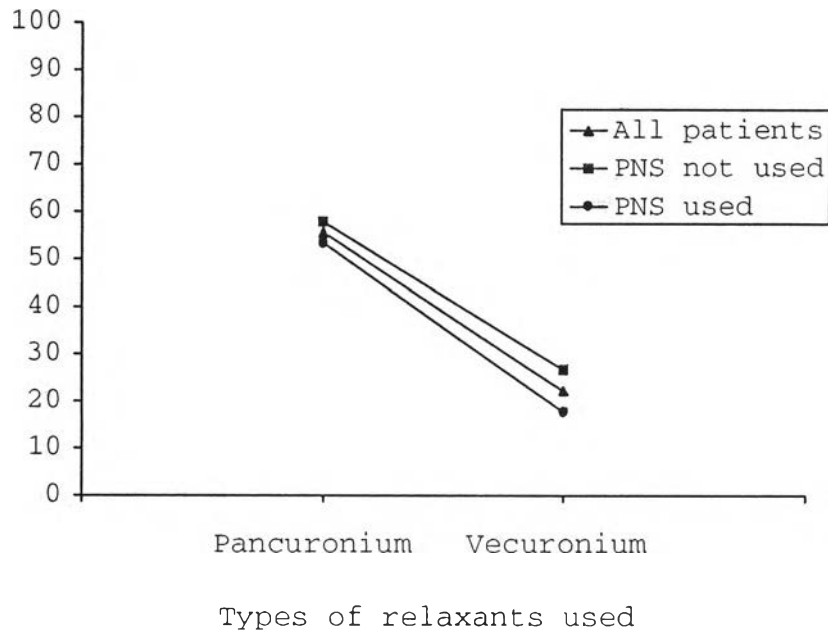Prevalence of residual relaxation
at 30 min. (%)

Types of relaxants used

<u>Fig. 5.1</u> This figure shows the effect of difference in types of relaxants on the prevalence of residual relaxation. Using vecuronium compared to pancuronium reduced the prevalence of residual relaxation (p = 0.00001). In addition, the effect of using different types of relaxants was statistically significant in both subgroups of patients to whom the PNS was or was not used (p = 0.001 and 0.006 respectively).

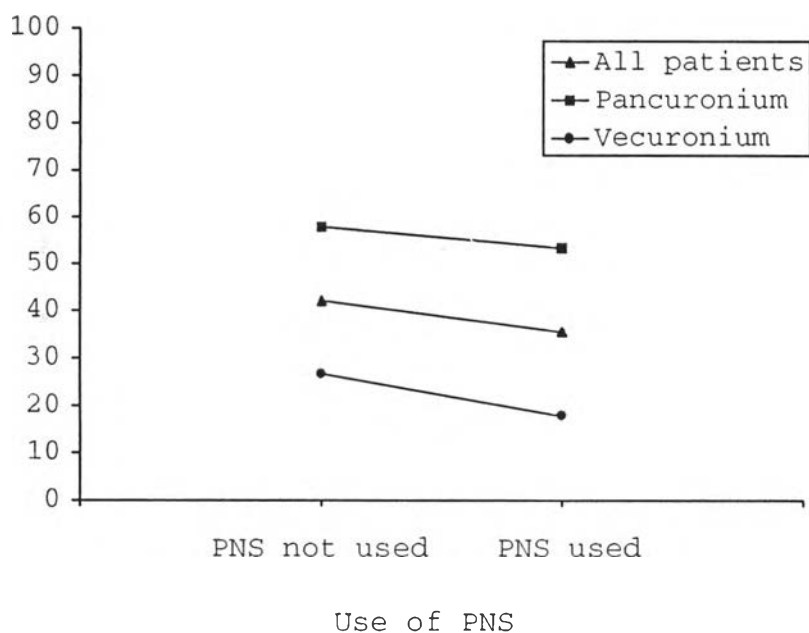Prevalence of residual relaxation
at 30 min. (%)

Fig. 5.2 This figure shows the effect of using PNS on the prevalence of residual relaxation. Using PNS did not significantly affected the prevalence of residual relaxation (p = 0.44). The effect of using different types of relaxants was also not statistically significant in both subgroups of patients received pancuronium or vecuronium (p = 0.83 and 0.45 respectively).