

抗癌劑 Nitrogen Mustard가 血液像에 미치는 影響에 관한 實驗的 研究

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THE STUDY ON THE EFFECTS OF THE NITROGEN MUSTARD TO THE BLOOD OF THE RABBIT.

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..... > Abstract <

It is important that anticarcinogen such as nitrogen mustard can destroy and inhibit multiplying cancer cells, but the agent not only injures the cancer cells but also the normal cells.

The author studied the effects of nitrogen mustard how to influence blood of the rabbit.

Twenty one rabbits were used. The experimental rabbits were given an intramuscular injection of Endoxan, as nitrogen mustard derivatives, 50mg. per 1.5-1.8 kg. of body weight.

The blood examination was accomplished on the day of 1st, 3rd, 5th, 7th, 10th and 14th after injection of Endoxan.

The results were drawn as follows.

1. The administration of Endoxan as anticarcinogen decreased the erythrocytes of the experimental rabbits.
2. The administration of Endoxan also decreased leukocytes of the experimental rabbits.
3. The lymphocytes of leukocytes were remarkably decreased by the administration of Endoxan.
4. The plateletes were decreased by the administration of Endoxan.
5. The prolonged blood coagulation time was followed under the administration of Endoxan.
6. The bleeding time was prolonged under the administration of Endoxan.

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口腔癌의 早期診斷과 適切한 處置는 患者의 生命과 直結된 問題로서 齒科醫師의 重要한 任務 가운데 하나인 것이다.

口腔領域에 發生하는 惡性腫瘍은 大體로 全身에 發生

하는 惡性腫瘍의 4~5%의 높은 比率을 占하고 있다.

惡性腫瘍에 對한 治療法은 大體로 外科的 處置 方法, 放射線治療法 抗癌劑를 使用하는 化學療法으로 大別할 수 있다.

그러나 惡性腫瘍의 理想的 根治療法으로서 適切한 化學療法劑 開發과 이의 應用이 將次 가장 理想的 方法이 되리라 믿어 의심치 않는다.

抗癌劑中의 하나인 Endoxan은 Nitrogen Mustard 系 誘導體로서 DNA合成을 抑制하여 細胞의 核分裂을 하지 못하게 함으로서 癌細胞의 增殖을 抑制하여 治療하는 化學療法劑인 것이다.

모든 抗癌劑가 그러 하듯이 Endoxan 역시 個體가 가지고 있는 正常組織이나 細胞에 적지 않은 危害作用을 하고 있는 것은 臨床에서 큰 問題를 提起하는 것이 라 하겠다.

그러하여 著者は 抗癌劑로 使用되는 Endoxan이 血液에 미치는 影響에 關한 研究를 하고져 實驗用으로 一定 期間 飼育한 家兎를 가지고 研究하였던 바 多少의 知見을 얻었기에 茲에 報告하는 바이다.

II. 實驗材料 및 方法

實驗材料: 本 研究의 實驗材料는 實驗用으로 一定 期間 飼育한 生後 6個月 內외의 健康한 白色雄性家兎 21

頭(體中 1.5~1.8kg.)이었다.

實驗方法: 實驗用家兎를 實驗群과 對照群으로 分類하였고, 實驗群家兎에 Endoxan(日本 鹽野義 製藥株式會社製)을 體重 1.5~1.8kg. 當 50mg.씩 筋肉注射後에 1, 3, 5, 7, 10 및 14日頃에 各各 血液을 採취하여 赤血球, 白血球, 白血球百分率, 血小板計算, 血液凝固時間 測定 및 生體에서 出血時間을 測定하였다.

實驗項目

1. Endoxan 投與後 赤血球數
2. Endoxan 投與後 白血球數
3. Endoxan 投與後 白血球百分率
4. Endoxan 投與後 血小板數
5. Endoxan 投與後 血液凝固時間
6. Endoxan 投與後 出血時間

III. 實驗成績

1. Endoxan 投與後 赤血球數

Endoxan 투여 후 赤血球數를 보면 第1 및 第2表에서 보는 바와 같이 對照群에서는 別變動이 없었으나, Endoxan을 투여한 實驗群에서는 투여 전에 592만이었으나, Endoxan 투여 後 1日頃에 546만, 3日頃에 474만, 5日頃에 455만, 7日頃에 462만, 10日頃에 478만 그리고 14日頃에 507만으로 赤血球의 심각한 減少를 보였다.

Table 1. The R.B.C. in the Experimental Group (Unit : 10 Thousand)

| day No. Rabbit | before administra- tion | 1 day after | 3 days after | 5 days after | 7 days after | 10 days after | 14 days after |
|-------------------|-------------------------------|----------------|-----------------|-----------------|-----------------|------------------|------------------|
| 1 | 630 | 477 | | | | | |
| 2 | 580 | 515 | | | | | |
| 3 | 605 | 547 | 440 | | | | |
| 4 | 530 | 481 | 416 | | | | |
| 5 | 563 | 459 | 450 | 442 | | | |
| 6 | 625 | 566 | 517 | 525 | | | |
| 7 | 643 | 629 | 440 | 410 | 435 | | |
| 8 | 612 | 580 | 538 | 557 | 464 | | |
| 9 | 510 | 460 | 420 | 355 | 390 | 395 | |
| 10 | 634 | 629 | 537 | 402 | 504 | 510 | |
| 11 | 630 | 624 | 550 | 535 | 535 | 548 | 555 |
| 12 | 550 | 539 | 501 | 495 | 500 | 502 | 505 |
| 13 | 545 | 530 | 456 | 444 | 445 | 475 | 478 |
| 14 | 624 | 611 | 426 | 415 | 420 | 438 | 490 |
| mean | 592 | 546 | 474 | 455 | 462 | 478 | 507 |

Table 2.

The R. B. C. in the Control Group

(Unit : 10 Thousand)

| day No. Rabbit | before Experimen- tal | 1 day after | 3 days after | 5 days after | 7 days after | 10 days after | 14 days after |
|-------------------|-----------------------------|----------------|-----------------|-----------------|-----------------|------------------|------------------|
| 15 | 534 | 535 | | | | | |
| 16 | 530 | 531 | 532 | | | | |
| 17 | 580 | 585 | 584 | 580 | | | |
| 18 | 554 | 555 | 553 | 554 | 555 | | |
| 19 | 520 | 521 | 525 | 524 | 520 | 521 | |
| 20 | 525 | 524 | 525 | 526 | 527 | 525 | 527 |
| 21 | 585 | 586 | 584 | 585 | 585 | 584 | 585 |
| mean | 547 | 548 | 551 | 555 | 547 | 543 | 556 |

2. Endoxan 投與後 白血球數

Endoxan 투여 후 白血球數를 보면 第3 및 第4表에서 보는 바와 같이 對照群에서는 別變動이 없었으나, 實驗群에서 投與前에 10,630이였으나, 투여 후 1日頃에 9,514, 3日頃에 9,108, 5日頃에 8,750, 7日頃에 8,975, 10日頃에 8,860 및 14日頃에 9,200으로 減少를 보였다.

Table 3.

The W. B. C in the Experimental Group.

| day No. Rabbit | before administra- tion | 1 day after | 3 days after | 5 days after | 7 days after | 10 days after | 14 days after |
|-------------------|-------------------------------|----------------|-----------------|-----------------|-----------------|------------------|------------------|
| 1 | 9,800 | 8,600 | | | | | |
| 2 | 9,600 | 8,400 | | | | | |
| 3 | 12,000 | 10,200 | 8,900 | | | | |
| 4 | 12,400 | 10,400 | 9,400 | | | | |
| 5 | 7,600 | 7,000 | 6,400 | 6,200 | | | |
| 6 | 9,300 | 9,000 | 8,800 | 8,500 | | | |
| 7 | 11,000 | 10,400 | 9,800 | 8,400 | 9,000 | | |
| 8 | 12,600 | 10,600 | 10,200 | 10,000 | 10,200 | | |
| 9 | 14,000 | 13,200 | 12,200 | 10,400 | 9,800 | 9,800 | |
| 10 | 9,800 | 8,200 | 7,800 | 7,800 | 8,200 | 8,200 | |
| 11 | 9,800 | 9,000 | 8,600 | 8,600 | 8,800 | 8,800 | 9,000 |
| 12 | 8,800 | 7,800 | 7,600 | 7,400 | 7,400 | 7,800 | 8,200 |
| 13 | 12,000 | 10,600 | 9,800 | 9,600 | 9,800 | 9,800 | 10,200 |
| 14 | 10,200 | 9,800 | 9,800 | 8,800 | 8,600 | 8,800 | 9,400 |
| mean | 10,630 | 9,514 | 9,108 | 8,570 | 8,975 | 8,860 | 9,200 |

Table 4.

The W. B. C in the Control Group.

| day No. Rabbit | before experimen- tal | 1 day after | 3 days after | 5 days after | 7 days after | 10 days after | 14 days after |
|-------------------|-----------------------------|----------------|-----------------|-----------------|-----------------|------------------|------------------|
| 15 | 8,600 | 8,800 | | | | | |
| 16 | 11,000 | 12,400 | 12,400 | | | | |
| 17 | 8,600 | 12,000 | 12,200 | 12,000 | | | |
| 18 | 11,400 | 12,400 | 12,400 | 12,600 | 11,800 | | |
| 19 | 8,800 | 10,600 | 10,400 | 10,200 | 10,000 | 9,800 | |
| 20 | 12,000 | 12,400 | 12,600 | 12,400 | 12,200 | 12,200 | 12,000 |
| 21 | 7,600 | 8,800 | 8,800 | 8,400 | 8,400 | 7,800 | 7,800 |
| mean | 9,714 | 11,057 | 11,466.7 | 11,120 | 10,600 | 9,933 | 9,900 |

Table 5.

The Differential Counts of Leukocytes in the Experimental Group.

| No. Rabbit | day | before administration | | | | | 1 day after | | | | | 3 days after | | | | | 5 days after | | | | | 7 days after | | | | | 10 days after | | | | | 14 days after | | | | | | | | |
|------------|-----|-----------------------|----|----|---|---|-------------|---|---|---|---|--------------|----|---|---|---|--------------|----|----|---|---|--------------|---|----|----|---|---------------|---|---|----|----|---------------|---|---|---|----|----|---|---|---|
| | | B | N | S | N | L | B | N | S | N | L | B | N | S | N | L | B | N | S | N | L | B | N | S | N | L | B | N | S | N | L | B | N | S | N | L | | | | |
| 1 | | 0 | 55 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | 35 | 0 | 1 | 0 | 0 | 59 | 38 | 2 | 0 | 0 | 0 | 66 | 32 | 2 | 0 | 0 | 0 | 65 | 30 | 2 | 0 | 0 | 0 | 75 | 23 | 0 | 0 | 0 |
| 2 | | 0 | 62 | 37 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | 35 | 1 | 0 | 0 | 0 | 59 | 38 | 2 | 0 | 0 | 0 | 66 | 32 | 2 | 0 | 0 | 0 | 70 | 28 | 0 | 0 | 0 | 2 | 75 | 23 | 0 | 0 | 0 |
| 3 | | 0 | 55 | 42 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 57 | 40 | 2 | 0 | 0 | 0 | 61 | 32 | 6 | 0 | 0 | 0 | 66 | 32 | 2 | 0 | 0 | 0 | 70 | 28 | 0 | 0 | 0 | 2 | 75 | 23 | 0 | 0 | 0 |
| 4 | | 1 | 48 | 48 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 62 | 32 | 6 | 0 | 0 | 0 | 61 | 32 | 6 | 0 | 0 | 0 | 66 | 32 | 2 | 0 | 0 | 0 | 70 | 28 | 0 | 0 | 0 | 2 | 75 | 23 | 0 | 0 | 0 |
| 5 | | 0 | 60 | 38 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 62 | 36 | 2 | 0 | 0 | 0 | 65 | 33 | 2 | 0 | 0 | 0 | 66 | 32 | 2 | 0 | 0 | 0 | 70 | 28 | 0 | 0 | 0 | 2 | 75 | 23 | 0 | 0 | 0 |
| 6 | | 2 | 56 | 40 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 59 | 39 | 0 | 0 | 0 | 0 | 63 | 35 | 0 | 0 | 0 | 0 | 63 | 34 | 0 | 0 | 0 | 0 | 65 | 29 | 2 | 0 | 0 | 3 | 65 | 30 | 2 | 0 | 0 |
| 7 | | 2 | 52 | 44 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 60 | 36 | 2 | 0 | 0 | 0 | 65 | 31 | 2 | 0 | 0 | 0 | 65 | 29 | 2 | 0 | 0 | 0 | 70 | 29 | 0 | 0 | 0 | 2 | 70 | 28 | 0 | 0 | 0 |
| 8 | | 0 | 57 | 39 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 32 | 0 | 0 | 0 | 0 | 69 | 30 | 0 | 0 | 0 | 0 | 70 | 29 | 0 | 0 | 0 | 0 | 76 | 23 | 0 | 0 | 0 | 3 | 76 | 21 | 0 | 0 | 0 |
| 9 | | 0 | 52 | 47 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 74 | 25 | 0 | 0 | 0 | 0 | 75 | 24 | 0 | 0 | 0 | 0 | 76 | 23 | 0 | 0 | 0 | 0 | 76 | 23 | 0 | 0 | 0 | 3 | 76 | 21 | 0 | 0 | 0 |
| 10 | | 2 | 50 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 63 | 36 | 0 | 0 | 0 | 0 | 65 | 34 | 0 | 0 | 0 | 0 | 66 | 32 | 0 | 0 | 0 | 0 | 76 | 23 | 1 | 0 | 0 | 2 | 66 | 31 | 1 | 0 | 0 |
| 11 | | 0 | 53 | 44 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 75 | 25 | 0 | 0 | 0 | 0 | 76 | 23 | 1 | 0 | 0 | 0 | 76 | 23 | 1 | 0 | 0 | 0 | 76 | 23 | 1 | 0 | 0 | 0 | 76 | 23 | 1 | 0 | 0 |
| 12 | | 0 | 52 | 48 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 | 38 | 0 | 0 | 0 | 0 | 76 | 22 | 2 | 0 | 0 | 0 | 76 | 21 | 2 | 0 | 0 | 0 | 76 | 23 | 1 | 0 | 0 | 0 | 70 | 29 | 1 | 0 | 0 |
| 13 | | 0 | 58 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 65 | 24 | 4 | 3 | 2 | 2 | 67 | 22 | 4 | 3 | 2 | 1 | 68 | 22 | 4 | 3 | 2 | 0 | 66 | 25 | 4 | 3 | 2 | 0 | 62 | 33 | 3 | 2 | 0 |
| 14 | | 1 | 52 | 46 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 32 | 4 | 4 | 2 | 0 | 61 | 30 | 4 | 3 | 2 | 0 | 62 | 29 | 4 | 3 | 2 | 0 | 61 | 32 | 4 | 2 | 1 | 0 | 58 | 35 | 4 | 2 | 1 |
| mean | | 1 | 54 | 43 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 64 | 33 | 2 | 1 | 0 | 1 | 67 | 30 | 2 | 1 | 0 | 1 | 69 | 27 | 2 | 1 | 0 | 1 | 70 | 27 | 2 | 1 | 0 | 1 | 68 | 30 | 2 | 1 | 0 |

Table 6.

The Differential Counts of Leukocytes in the Control Group.

| No. Rabbit | day | before administration | | | | | 1 day after | | | | | 3 days after | | | | | 5 days after | | | | | 7 days after | | | | | 10 days after | | | | | 14 days after | | | | | | | | |
|------------|-----|-----------------------|----|----|---|---|-------------|---|---|---|---|--------------|----|---|---|---|--------------|----|----|---|---|--------------|---|----|----|---|---------------|---|---|----|----|---------------|---|---|---|----|----|---|---|---|
| | | B | N | S | N | L | B | N | S | N | L | B | N | S | N | L | B | N | S | N | L | B | N | S | N | L | B | N | S | N | L | B | N | S | N | L | | | | |
| 15 | | 0 | 54 | 38 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 62 | 36 | 1 | 0 | 2 | 0 | 68 | 31 | 0 | 1 | 0 | 0 | 66 | 33 | 1 | 0 | 0 | 0 | 66 | 33 | 1 | 0 | 0 | 0 | 66 | 33 | 1 | 0 | 0 |
| 16 | | 0 | 68 | 30 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 69 | 30 | 0 | 1 | 0 | 0 | 67 | 33 | 0 | 0 | 0 | 0 | 66 | 33 | 1 | 0 | 0 | 0 | 66 | 33 | 1 | 0 | 0 | 0 | 66 | 33 | 1 | 0 | 0 |
| 17 | | 0 | 65 | 32 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 67 | 32 | 1 | 0 | 0 | 0 | 67 | 33 | 0 | 0 | 0 | 0 | 66 | 33 | 1 | 0 | 0 | 0 | 66 | 33 | 1 | 0 | 0 | 0 | 66 | 33 | 1 | 0 | 0 |
| 18 | | 0 | 56 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 34 | 4 | 2 | 2 | 0 | 57 | 35 | 4 | 2 | 2 | 0 | 57 | 37 | 4 | 2 | 0 | 0 | 57 | 37 | 3 | 2 | 1 | 0 | 57 | 37 | 3 | 2 | 1 |
| 19 | | 0 | 64 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 39 | 5 | 1 | 5 | 0 | 52 | 41 | 4 | 1 | 2 | 0 | 53 | 41 | 3 | 1 | 2 | 0 | 53 | 41 | 4 | 1 | 1 | 0 | 54 | 40 | 3 | 1 | 2 |
| 20 | | 0 | 63 | 36 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 56 | 42 | 0 | 1 | 1 | 0 | 56 | 42 | 1 | 0 | 1 | 0 | 55 | 42 | 2 | 0 | 1 | 0 | 56 | 42 | 2 | 0 | 0 | 0 | 57 | 43 | 0 | 0 | 0 |
| 21 | | 0 | 63 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 70 | 26 | 4 | 0 | 0 | 0 | 68 | 29 | 3 | 0 | 0 | 0 | 67 | 31 | 2 | 0 | 0 | 0 | 65 | 33 | 2 | 0 | 0 | 0 | 64 | 34 | 1 | 1 | 0 |
| mean | | 0 | 62 | 36 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 62 | 34 | 2 | 1 | 1 | 0 | 61 | 35 | 2 | 1 | 1 | 0 | 60 | 37 | 2 | 1 | 1 | 0 | 58 | 37 | 3 | 1 | 1 | 0 | 58 | 39 | 1 | 1 | 1 |

3. Endoxan 投與後 白血球百分率

Endoxan 投與後 白血球의 百分率을 보면 第5 및 第6 表에서 보는 바와 같이 特히 淋巴球가 투여전에 43%

이었던 것이, 투여 후 1日頃에 33%, 3日頃에 30%, 5日頃에 27%, 7日頃에 27%, 10日頃에 30% 그리고 14日頃에 33%로 下降되었음을 觀察할 수 있었다.

4. Endoxan 投與後 血小板數

Table 7. The Platelets Count in the Experimental Group. (Unit : Thousand)

| No. Rabbit | day before administration | 1 day after | 3 days after | 5 days after | 7 days after | 10 days after | 14 days after |
|------------|---------------------------|-------------|--------------|--------------|--------------|---------------|---------------|
| 1 | 310 | 280 | 260 | 265 | 280 | 282 | 284 |
| 2 | 315 | 265 | 244 | 250 | 256 | 260 | 286 |
| 3 | 217 | 186 | 180 | 174 | 172 | 178 | 186 |
| 4 | 230 | 196 | 184 | 180 | 184 | 188 | 196 |
| 5 | 330 | 284 | 264 | 265 | 265 | 272 | 284 |
| 6 | 210 | 182 | 178 | 175 | 172 | 174 | 186 |
| 7 | 215 | 178 | 178 | 174 | 176 | 182 | 188 |
| 8 | 255 | 214 | 210 | 210 | 214 | 218 | 220 |
| 9 | 230 | 202 | 194 | 196 | 198 | 198 | 200 |
| 10 | 316 | 276 | 274 | 268 | 268 | 286 | 286 |
| 11 | 290 | 264 | 262 | 264 | 268 | 268 | 270 |
| 12 | 195 | 168 | 166 | 166 | 168 | 170 | 172 |
| 13 | 230 | 198 | 196 | 196 | 198 | 201 | 204 |
| 14 | 280 | 262 | 260 | 260 | 264 | 268 | 270 |
| mean | 259 | 225 | 218 | 217 | 220 | 225 | 231 |

Table 8. The Platelets Count in the Control Group. (Unit : Thousand)

| No. Rabbit | day before experimental | 1 day after | 3 days after | 5 days after | 7 days after | 10 days after | 14 days after |
|------------|-------------------------|-------------|--------------|--------------|--------------|---------------|---------------|
| 15 | 296 | 296 | 298 | 296 | 296 | 294 | 296 |
| 16 | 260 | 258 | 260 | 260 | 262 | 260 | 260 |
| 17 | 345 | 342 | 345 | 345 | 344 | 342 | 344 |
| 18 | 280 | 278 | 278 | 280 | 281 | 280 | 280 |
| 19 | 260 | 258 | 258 | 260 | 262 | 260 | 260 |
| 20 | 310 | 309 | 310 | 310 | 310 | 311 | 310 |
| 21 | 280 | 280 | 281 | 282 | 280 | 281 | 280 |
| mean | 290 | 289 | 290 | 290 | 291 | 290 | 290 |

Endoxan 投與後 血小板數를 보면 第7 및 第8 表에서 보는 바와 같이 레조군에서 別 變動이 없으나, 實驗群에서는 투여 前에는 259,000이였으나, 투여 후 1日

頃에는 225,000, 3日頃 218,000, 5日頃 217,000, 7日頃 220,000, 10日頃 225,000 및 14日頃에는 231,000으로서 甚한 血小板減少를 보였다.

5. Endoxan 投與後 血液凝固時間

Table 9. The Blood Clotting Time in the Experimental Group. (Minute/Second)

| No. Rabbit | day before administration | 1 day after | 3 days after | 5 days after | 7 days after | 10 days after | 14 days after |
|---------------|---------------------------|-------------|--------------|--------------|--------------|---------------|---------------|
| 1 | 1'40'' | 2'30'' | | | | | |
| 2 | 2'10'' | 3'00 | | | | | |
| 3 | 2'30'' | 3'15'' | 3'30'' | | | | |
| 4 | 3'00'' | 3'35'' | 3'55'' | | | | |
| 5 | 2'40'' | 3'05'' | 3'24'' | 3'25'' | | | |
| 6 | 2'00'' | 2'26'' | 3'00'' | 3'15'' | | | |
| 7 | 3'00 | 3'15 | 3'20'' | 3'20'' | 3'15'' | | |
| 8 | 2'30'' | 2'42'' | 2'45'' | 2'50'' | 2'43'' | | |
| 9 | 2'40'' | 2'45'' | 2'48'' | 2'49'' | 2'46'' | 2'43'' | |
| 10 | 1'30'' | 1'48'' | 2'15'' | 2'21'' | 2'16'' | 2'12'' | |
| 11 | 2'00'' | 2'13'' | 2'25'' | 2'34'' | 2'21'' | 2'20'' | 2'13'' |
| 12 | 3'00'' | 3.09'' | 3'28'' | 3'28'' | 3'24'' | 3'22'' | 3'10'' |
| 13 | 2'10'' | 2'18'' | 2'21'' | 2'25'' | 2'22'' | 2'20'' | 2'16'' |
| 14 | 2'50'' | 2'58'' | 3'05'' | 3'15'' | 3'14'' | 3'12'' | 3'07'' |
| mean (minute) | 2.41 | 2.78 | 2.86 | 2.97 | 2.84 | 2'69 | 2.69 |

Table 10. The Blood Clotting Time in the Control Group. (Minute/Second)

| No. Rabbit | day before experimental | 1 day after | 3 days after | 5 days after | 7 days after | 10 days after | 14 days after |
|---------------|-------------------------|-------------|--------------|--------------|--------------|---------------|---------------|
| 15 | 1'50'' | 1'52'' | | | | | |
| 16 | 1'40'' | 1'41'' | | | | | |
| 17 | 3'00'' | 3'02'' | 3'04'' | 3'01'' | | | |
| 18 | 2'55'' | 2'55'' | 2'56'' | 2'55'' | 2'56'' | | |
| 19 | 1'10'' | 1'11'' | 1'09'' | 1'10'' | 1'13'' | 1'12'' | |
| 20 | 1'45'' | 1'45'' | 1'46'' | 1'46'' | 1'43'' | 1'45'' | 1'47'' |
| 21 | 1'00'' | 1'04'' | 1'05'' | 1'03'' | 1'05'' | 1'03'' | 1'03'' |
| mean (minute) | 1.90 | 1.93 | 1.94 | 1.98 | 1.74 | 1.33 | 1.25 |

Endoxan 投與後 血液凝固時間을 보면 第 9 및 第 10 表에서 보는 바와 같이 對照群에서는 血液凝固時間이 大體로 1.90~1.25分이었으나, 實驗群에서는 투여 전에 2.41分이었으나, 投與後 1日頃에 2.78分, 3日頃 2.86分 5日頃에 2.97分, 7日頃에 2.84分, 10日頃에 2.69分 및 14日頃에 2.69分으로 大體로 血液凝固時間이 延長됨을 觀察할 수 있었다.

6. Endoxan 投與後 出血時間

Table 11. The Bleeding Time in the Experimental Group (Unit : Second)

| No. Rabbit | day before administration | 1 day after | 3 days after | 5 days after | 7 days after | 10 days after | 14 days after |
|------------|---------------------------|-------------|--------------|--------------|--------------|---------------|---------------|
| 1 | 35 | 55 | | | | | |
| 2 | 38 | 58 | | | | | |
| 3 | 52 | 58 | 85 | | | | |
| 4 | 60 | 64 | 92 | | | | |
| 5 | 45 | 56 | 96 | 98 | | | |
| 6 | 40 | 52 | 84 | 96 | | | |
| 7 | 60 | 66 | 68 | 72 | 68 | | |
| 8 | 30 | 34 | 38 | 36 | 36 | | |
| 9 | 45 | 52 | 57 | 62 | 62 | 58 | |
| 10 | 35 | 43 | 45 | 48 | 48 | 46 | |
| 11 | 50 | 52 | 56 | 58 | 56 | 56 | 56 |
| 12 | 65 | 66 | 68 | 71 | 70 | 68 | 68 |
| 13 | 80 | 83 | 83 | 85 | 84 | 84 | 82 |
| 14 | 35 | 38 | 40 | 43 | 42 | 42 | 39 |
| mean | 47.86 | 55.5 | 67.67 | 66.90 | 58.25 | 59.00 | 61.25 |

Table 12. The Bleeding Time in the Control Group. (Unit : Second)

| No. Rabbit | day before experimental | 1 day after | 3 days after | 5 days after | 7 days after | 10 days after | 14 days after |
|------------|-------------------------|-------------|--------------|--------------|--------------|---------------|---------------|
| 15 | 36 | 36 | | | | | |
| 16 | 40 | 40 | 41 | | | | |
| 17 | 35 | 36 | 35 | 36 | | | |
| 18 | 60 | 62 | 60 | 62 | 60 | | |
| 19 | 30 | 33 | 30 | 32 | 33 | 30 | |
| 20 | 45 | 45 | 46 | 43 | 45 | 46 | 45 |
| 21 | 45 | 44 | 46 | 45 | 45 | 44 | 45 |
| mean | 41.57 | 42.29 | 43.00 | 43.60 | 45.75 | 40.00 | 45.00 |

Endoxan 投與後 出血時間을 보면 第11 및 第12表에서 보는 바와 같이 對照群에서 大體로 出血時間이 41.57~45.00초이었으나, 實體群에서는 투여 전에 47.86초이었으나, Endoxan 投與後 1日頃에 55.5초, 3日頃에 67.67초, 5日頃에 66.90초, 7日頃에 58.25초, 10日頃에 59.00초 및 14日頃에 61.25초로 出血時間이 延長됨을 觀察할 수 있었다.

IV. 考 按

現代醫學의 進步인 發展에도 不拘하고 惡性腫瘍에 의 한 高貴한 人間生命의 犧牲은 점점 增加되고 있는 傾向이 있다.

制癌의 지름길을 早期診斷과 適切한 處置에 있는 것

이다.

現在 惡性腫瘍 處置에 있어서 外科的 處置, 放射線治療와 더불어 抗癌劑를 使用하는 化學療法이 널리 施行되고 있다.

抗癌劑로서의 Nitrogen Mustard는 DNA 合成을 抑制하여 細胞分裂을 방해하므로서 癌病巢를 治療에 하는 藥劑로서, Ash¹⁾(1972), Block²⁾(1971), Brock³⁾(1967), Brookes⁴⁾(1964), Camenga¹³⁾(1974), Chanke¹⁵⁾(1967), Chaube¹⁶⁾(1968), Conen¹⁸⁾(1961), Evans²⁰⁾(1969), Ferguson²¹⁾(1960), Forney²⁴⁾(1975), Goldenberg²⁵⁾(1968), Haskin³²⁾, Kerckaert^{36/37)}(1974), (1974), Khrushchov³⁸⁾(1974), Koppang³⁹⁾(1973), Koppang⁴⁰⁾(1973), Lane⁴¹⁾(1959), Matejkova⁴⁵⁾(1975), Miller⁴⁷⁾

(1966), Nasileti⁵⁰⁾(1966), Rutman⁵⁸⁾(1969), Sharpe⁶²⁾(1971), Stenarm⁶⁴⁾(1968), Stockman⁶⁵⁾(1973), Vahlsing⁶⁹⁾(1975) 및 Wheeler⁷⁴⁾(1969) 등은 Nitrogen Mustard를 抗癌療法劑로 사용한 研究結果를 報告한 바 있으며, Cahen¹²⁾(1964), Chanke¹⁵⁾(1967), Chaube¹⁶⁾(1968), Conen¹⁸⁾(1961), Dangorth¹⁹⁾(1958), Evans²⁰⁾(1969), Greenberg²⁶⁾(1964), Marshak³⁵⁾(1945), Nasileti⁵⁰⁾(1966), Sharpe⁶²⁾(1971), Singh⁶³⁾(1974), Vahlsing⁶⁹⁾(1975) 및 Wilson⁷³⁾(1968) 등은 이들 抗癌劑가 染色體變화를 招來하여 畸型을 惹起하는 原因이 된다고 하였다.

또한 Ash¹⁾(1972)는 생쥐의 造血細胞 再生에 있어서 Nitrogen Mustard가 역제적인 작용을 한다고 보고 하였으며, Matejkova⁴⁵⁾(1975)는 본 抗癌劑를 使用하여 腫瘍治療後에 血球 및 末梢 淋巴球核의 形態에 대하여 연구하였고, Sharpe⁶²⁾(1971)는 末梢血液 淋巴球의 染色體變異에 대하여, 그리고 Struck⁶⁶⁾(1975)는 Cyclophosphamide의 血液代謝에 미치는 影響에 對하여 研究報告한 바 있다.

이와 같이 이들 抗癌劑는 癌細胞에도 核酸代謝를 妨害하여 細胞分裂을 抑制하지만 正常細胞에도 심각한 危害作用을 하기 때문에 보다 效果있고, 正常細胞에는 아무런 障礙를 주지 않고, 癌細胞에만 致命打를 加할 수 있는 새로운 抗癌劑開發이 要請되는 것이다.

著者は Nitrogen Mustard가 血液像에 미치는 研究를 하고져 實驗用 白色雄性家兎에 Endoxan을 體重 1.5~1.8kg. 當 50mg. 씩 筋注로 投與하였던 바 赤血球는 對照群에서는 547만~556만으로서 全般的으로 別變動이 없었으나, Endoxan을 投與한 實驗群에서는 592만에서 507만으로 減少를 보였는데 Nitrogen Mustard가 造血장기에 손상을 주기 때문인 것으로 생각되었다.

白血球數를 보면 對照群에서 9,714~9,900으로 別다른 異常을 볼 수 없었으나, 實驗群에서는 10,630에서 9,200으로 심한 減少 현상을 보였는 바 이는 Ash¹⁾(1972), Matejkora⁴⁵⁾(1975) 및 Struck⁶⁶⁾(1975) 등의 報告와 一致하였다.

白血球百分率을 보면 特別히 實驗群에서 淋巴球가 43%에서 33%로 減少하였는 바 이는 抗癌劑 Endoxan이 生體 防禦機轉을 行하는 淋巴球에도 심각한 危害作用을 한다는 것을 立證하는 것이라 하겠다.

血小板數를 보면 對照群에서 大體로 290만이었으나 實驗群에서는 259만에서 231만으로 減少되었는 바, 이것은 출혈시간 및 혈액응고 시간이 지연된다는 事實과 부합된다 하겠다.

血液凝固 時間을 보면 對照群에서는 血液凝固 時間이

大體로 1.90~1.25分으로 別다른 變化가 없었으나, 實驗群에서는 2.41分에서 2.69分으로 血液凝固 時間이 지연됨을 觀察할 수 있었다.

出血時間을 보면 對照群에서 41.57~45.00초로서 別變化가 없었으나, 實驗群에서는 47.86초에서 61.25초로 연장되었는 바 이는 抗癌劑 Endoxan 投與가 血液像 特別히 赤血球數 및 白血球數의 심한 減少와 淋巴球의 減少, 血小板의 減少 및 血液凝固 時間 지연 및 出血時間 延長에 큰 影響을 하는 것으로 보아서 抗癌劑가 生體 健康細胞에도 많은 危害作用을 함을 알 수 있다 하겠다.

V. 結 論

著者は 抗癌劑 Nitrogen Mustard가 血液像에 미치는 影響을 研究하고져 實驗用은 一定期間 飼育한 生後 6個月 内外의 白色雄性家兎(體重 1.5~1.8kg.) 21頭를 對照群과 實驗群으로 區分하고, 實驗群家兎 體重 1.5~1.8kg. 當 Endoxan 50mg. 을 筋注로 投與한 後에 血液像 特別히 赤血球數, 白血球數, 白血球百分率, 血小板數, 血液凝固時間 및 出血時間에 對하여 研究하였던 바 다음과 같은 結論을 얻었다.

1. 抗癌劑 Nitrogen Mustard 系인 Endoxan 投與가 赤血球의 심한 減少를 招來하였다.
2. 抗癌劑 Endoxan 投與가 白血球의 심한 減少를 招來하였다.
3. 抗癌劑 Endoxan 投與가 白血球中 特別히 淋巴球의 심한 減少를 보였다.
4. 抗癌劑 Endoxan 投與가 血小板의 심한 減少를 보였다.
5. 抗癌劑 Endoxan 投與가 血液凝固時間을 지연시켰다.
6. 抗癌劑 Endoxan 投與가 出血時間을 延長시켰다.

(本 論文을 完成함에 있어 主任 金圭植 教授님과 指導 南日祐 教授님께 深甚한 謝意를 表하며 口腔外科教室 여러 先生님께 感謝의 뜻을 表하는 바이다.)

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