

**Staff Meeting Bulletin  
Hospitals of the » » »  
University of Minnesota**



**Analysis of  
Prolonged Anesthesia**

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during the school year, October to June, inclusive.

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William A. O'Brien, M.D.

I. LAST WEEK

Date: May 14, 1943  
Place: Recreation Room,  
Powell Hall.  
Time: 12:15 to 1:15 P.M.  
Program: "Psychiatric Problems in  
Children"

Eric Kent Clarke  
 Reynold A. Jensen  
 Discussion  
 J. Charnley McKinley  
 Irvine McQuarrie

Attendance: 110

Gertrude Gunn,  
Record Librarian  
 - - -

II. MEETINGS1. INTERDEPARTMENTAL SEMINAR

Wednesday, May 26, at 8:00  
p.m. in Eustis Amphitheatre.

Presentation of three living cases of  
congenital oesophageal atresia with  
tracheo-oesophageal fistula. (10 minutes)

Logan N. Leven and Arild E. Hansen  
Departments of Surgery and Pediatrics

Investigations concerning absorption,  
distribution and retention of the ars-  
phenamines in relation to therapeutic  
and toxic effects. (30 minutes)

H. N. Wright  
Department of Pharmacology

Study of the action of digitalis in enlarg-  
ed but not decompensated hearts as well as  
in normal hearts. (30 minutes)

Eldon Erickson and George E. Fahr  
Mayo Foundation and Department of Medicine  
 - - -

2. ANATOMY SEMINAR

Saturday, May 22, at 11:30  
a.m. in Institute of Anatomy.

"Growth and Composition of Human  
Skeleton." R. E. Scammon

"The Adrenal Glands of Fetuses"  
Leslie G. Reed  
 - - -

III. MINNESOTA HOSPITAL ASSOCIATION  
AND ALLIED ORGANIZATIONS

May 23, 24, 24, 1943

Sunday, May 23

Registration, Nicollet Hotel.

6:30 - Buffet Supper - Curtis Hotel.

Address: "Minnesota Hospital in Histor-  
ical Perspective"

Theodore C. Blegen,  
Dean, Graduate School,  
University of Minnesota

Address: Bert W. Caldwell, Executive  
Secretary Emeritus, American Hospital  
Association.

Presentation of National Hospital Day  
Award for best public relations pro-  
gram in cities (up to 100,000).

Dina Bremness, Administrator, Glenwood  
Community Hospital, Glenwood, Minnesota.

Monday, May 24

9:30 to 12:30 - Symposium - War time  
problems (nursing, supplies, equipment).  
Miss Coltharp, Miss Gorgas, and Mr.  
Jones.

12:30 Luncheon - Remarks.

2:00 General Session, Reports of fol-  
lowing groups: Occupational Therapy,  
Physiotherapy, Record Librarians, Nurse  
Anesthetists, Dietitians, Medical Li-  
brarians, Housekeepers, Social Workers,  
Nurses.

7:00 - Annual Banquet - Address, Dr.  
Donald T. Cowling, Carleton College.

Tuesday, May 25

8:00 a.m. - Meeting of American College  
of Hospital Administrators

9:30 a.m. - Insurance Problems, Pre-  
sident's address. Reports of officers  
and committees. 12:30 - Luncheon,  
"Public Relations", Alden Mills, Chicago.  
"War Time Problems," M. D. MacEachern.

2:00 - Administrative Problems of small  
Hospitals. Annual Meeting of A.O.

IV. ANALYSIS OF PROLONGED ANESTHESIA

Scott M. Smith

Last year the Anesthesia staff decided, because of the unusual number of difficult and complicated surgical procedures performed at this hospital, that it would be of interest to make an analysis of these long cases. The object was to find out just how the average patient undergoing a prolonged procedure reacted to his anesthetic and to his surgical procedure.

Dr. Grimm presented an excellent analysis of the prolonged anesthesia cases and called attention to the fact that spinal anesthesia for gastrectomy, supplementing it in every case with some form of general anesthesia from the start was just beginning to be used. Of the 155

gastrectomy cases in his series only 6, or 3.8%, had received this type of anesthesia. It was their impression at that time, that these patients were doing much better clinically than those same cases not receiving spinal anesthesia.

Three hours was arbitrarily selected as a minimum time for a "long" operation and all cases included in the survey were three hours or more in duration. Because one cannot compare two totally different types of surgical operations the cases were divided into six groups: namely, Brain, Other Neurosurgery, Chest, Gastro-intestinal, and Miscellaneous cases. In the survey this year the same time and classification as to groups of cases has been used.

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Table No. 1

## DISTRIBUTION OF CASES IN THE TWO SURVEYS

Type	Previous Survey			Present Survey		
	Average Age	No. of Cases	Average Duration	Average Age	No. of Cases	Average Duration
Brain	39	60	5' 20"	36	46	4' 20"
Other Neurosurgery	49	27	3' 36"	35	36	3' 30"
Chest	30	15	5' 54"	27	14	4' 25"
Gastrectomies	63	155	5' 6"	52	112	4' 49"
Other Gastro-Intestinal	52	127	4' 6"	49	95	4' 25"
Miscellaneous	39	69	3' 36"	51	82	3' 35"
Total		454			385	

The analysis presented last year covered 39 months with a total of 454 consecutive operations of three or more hours in length. The analysis this year covers 12 months with a total of 385 consecutive operations of 3 or more hours in length between April 27, 1942 and April 27, 1943. Of these 385 cases: 46 were brain cases, 36 other neurosurgery, 14 chest, 112 gastrectomies, 95 other gastro-intestinal, and 82 miscellaneous cases.

We see from this that during the first survey there was an average of 12 long cases done per month, and during the past 12 months there was an average of 32 such cases per month. This makes it appear that more and more difficult cases are coming to surgery. The brain cases averaged thirty-six years in age, other neurosurgery 35 years, chest 27 years, other gastro-intestinal 49 years, miscellaneous 51 years and gastrectomies

still top the list at 52 years.

It is interesting to note that in each group of cases there has been a marked decrease in the average age of patients coming to surgery.

This may well mean that the diagnosis is being made much earlier. It might also mean that the lesions are occurring in younger age groups or perhaps they are just getting the old ones weeded out.

Of the total number of cases 181 were 3 to 4 hours in duration, 117 cases were 4 to 5 hours, 55 were 5 to 6 hours, 22 were 6 to 7 hours in duration, 7 were 7 to 8 hours, and 3 were 8 to 9 hours in duration. The longest case was 8 hours and 40 minutes. The average duration does not mean much since the short cases of each type were not considered. However, it does indicate that there are more long cases in some types than others. Gastrectomies were the longest at 4 hours and 49 minutes. Chest and other gastrointestinal each averaged 4 hours and 25 minutes. Brain cases averaged 4 hours and

20 minutes each and the miscellaneous cases averaged 3 hours and 35 minutes. Other neuro-surgical cases averaged the shortest time, being 3 hours and 30 minutes per case.

Table No. 2

CASES DIVIDED AS TO DURATION

Hours	Previous Survey	Present Survey
3 to 4	226	181
4 to 5	117	117
5 to 6	60	55
6 to 7	37	22
7 to 8	7	7
8 to 9	3	3
9 to 10	1	0
10 to 11	1	0
Total	454	385

Table No. 3

PRE-OPERATIVE CONDITIONS OF PATIENTS

Type	Previous Survey					Present Survey				
	Age	Preop. S	B.P. D	Hgb. Gms.	Plasma Protein Gms.	Age	Preop. S	B.P. D	Hgb. Gms.	Plasma Protein Gms.
Brain	39	121	74	12.6	6.7	36	120	71	13.8	6.4
Other Neuro-Surgery	49	130	77	13.2	5.7	35	142	78	13.7	---
Chest	30	133	77	12.3	7.4	27	122	75	11.3	6.8
Gastrectomies	63	125	73	12.2	6.6	52	122	67	12.4	6.6
Other Gastro-Intestinal	52	122	69	12.3	6.9	49	125	67	12.1	7.7
Miscellaneous	39	121	72	12.7	6.4	51	129	72	12.8	6.8

The pre-operative hemoglobin was a quite uniform and favorable figure of 11.3 to 13.8 gms. per 100 cc. Plasma proteins were 6.4 to 6.8 gms. per 100 cc. except for other gastro-intestinal cases which averaged 7.7 gms. per 100 cc. It

is interesting to note that plasma proteins were not determined on other neuro-surgery cases in a single instance. It is also interesting to note the uniformity of the hemoglobin and plasma proteins in the two surveys.

Table No. 4

## PREMEDICATION

Type	Previous Survey				Present Survey			
	MS.	COD.	AT.	SC.	MS.	COD.	AT.	SC.
Brain	11	41	47	12	1	44	-	46
Other Neuro- surgery	11	15	11	12	23	13	-	36
Chest	3	11	12	3	5	9	-	14
Gastrectomies	58	71	71	58	105	8	2	105
Other Gastro- Intestinal	58	65	74	50	91	5	-	94
Miscellaneous	45	13	31	36	79	2	1	80
Total	186	216	251	171	304	81	3	375

Three hundred and four cases received morphine, 81 received codeine sulphate and 3 received atropine sulphate, and 375 received hyoscine hydrobromide.

It will be noted from the table there has been a considerable change in the premedication the patients received during the two surveys. The first difference noted is in the number of cases receiving morphine. During the period covered by the first survey only 41% of the cases received morphine while during the period of the present survey 78% of all cases received morphine. During much of the time of the first series no brain or chest cases and no one over 50 years of age received morphine. Denying a person of morphine because he is over 50 years of age carries little more logic than denying one of the advantages of surgery because he is over 50. Morphine is now given according not only to the age of the patient but his general condition,

considering weight, strength, vitality, debility, etc. And the dose is gauged according to the amount required to give the desired physiological effect whether it be 1/100 gr. or 1/2 gr.

There is a marked decrease in the number of cases receiving atropine and codeine in the present survey as compared with the first survey.

In the present survey 375 cases or 95% of all cases received hyoscine hydrobromide as compared to 171 cases or 37% in the previous survey. Hyoscine hydrobromide has replaced atropine mainly because of the comparatively large number of atropine reactions noted in the past. It has also been shown that there is much less respiratory depression resulting from morphine, when morphine and hyoscine are given in the ratio of 1:25, than when combinations of morphine and atropine are used.

Table No. 5

## ANESTHETIC AGENTS USED

Type	Previous Survey						Present Survey					
	Cyclo	Ethy- lene	Ethyl- Ether	Pento	Spinal	Trach Tube	Cyclo	Ethy- lene	Ethyl- Ether	Pento	Spinal	Trach Tube
Brain	51	18	3	6	0	55	44	0	3	1	0	44
Other Neu- ro surg.	25	2	1	6	1	22	36	0	1	10	0	35
Chest	8	2	0	6	0	9	14	0	0	1	0	13
Gastrec- tomies	144	42	2	7	6	136	112	0	2	5	104	112
Other Gas- tro-In- testinal	126	32	2	3	7	101	93	0	1	9	80	80
Miscel- laneous	55	21	10	11	1	35	44	12	13	17	13	29
Total	409	117	18	39	15	358	343	12	20	43	197	313

Of the anesthetic agents cyclopropane was utilized the most frequently: 95% in brain cases, 100% in other neuro-surgery, 100% in chest, 100% in gastrectomies, 97% in other gastro-intestinal and 53% in miscellaneous cases. This shows an increase in the number of cases receiving cyclopropane in the brain, other neuro-surgery, chest, and gastrectomy cases, with a decrease in the miscellaneous cases.

Ninety-three per cent of gastrectomies received spinal anesthesia in the past 12 months as compared to 3.8% for previous 39 months. Eighty-four per cent of the other gastro-intestinal cases received

spinals. In the previous survey, of the total of 454 cases, 15, or 3%, received spinals while of the 385 cases in the present survey 197, or 51%, received spinals.

Tracheal tubes are being used in a larger percentage of cases. Brain 95%, gastrectomies 100%, and other gastro-intestinal 84%. The tracheal tubes used were practically all of the type developed by Dr. Grimm and Dr. Knight with cuffs cemented to the regular tube. There has been no evidence to show that this type of tube causes any more damage to the trachea or larynx than other types of tubes.

Table No. 6

## PREOPERATIVE AND OPERATIVE PERIOD BLOOD PRESSURES

Type	Preop.		Operative Period Pressures								
	S	D	High			Low			End		
			S	D	Time	S	D	Time	S	D	
Brain	120	71	154	83	1'14"	88	57	3'41"	100	62	
Other Neuro- surgery	142	78	164	82	1'18"	99	61	2'18"	112	66	
Chest	122	75	142	78	1'21"	98	59	2'42"	115	69	
Gastrectomies	122	67	152	78	1'45"	93	62	1'21"	123	71	
Other Gastro- intestinal	125	67	145	76	1'22"	88	54	1'57"	116	60	
Miscellaneous	129	72	157	81	51"	101	61	1'49"	122	70	

The average pre-operative systolic blood pressures were remarkably uniform, ranging from 120 to 129 with the exception of other neuro-surgery cases which topped the list with 142. The pre-operative diastolic pressures were also quite uniform: The lowest being 67 and the highest 78. The highest blood pressure recording occurred in next to the youngest age group.

The highest blood pressure reading during the entire anesthetic procedure was recorded and also the time at which it occurred. The average systolic reading for brain cases was 154, other neuro-surgery cases 164, chest cases 142, gastrectomies 152, other gastro-intestinal cases 145 and miscellaneous cases 157. The average diastolic readings were 76 to 83. The peak occurred from one hour and fourteen minutes to one hour and forty-five minutes after beginning the anesthetic except in the miscellaneous cases where it was fifty-one minutes.

The lowest blood pressure was likewise recorded and timed. There was consider-

able variation in the time at which the lowest pressure occurred. It varied from one hour and twenty-one minutes after starting anesthesia in the gastrectomy cases to three hours and forty-one minutes in the brain cases. The average lowest systolic pressures were 88 to 101 and the diastolic 54 to 62. The lowest average pressure occurred in the other gastro-intestinal group, being 88 systolic with a diastolic of 54. The highest average pressure for the low period occurred in the miscellaneous group, being 101 systolic with a diastolic of 61.

The average systolic blood pressures taken just before leaving the operating room varied from 123 for the gastrectomy cases to 100 for the brain cases. Diastolic readings ranged from 60 to 71. It is interesting to note that both the systolic and diastolic pressures of the gastrectomy group were higher at the end of the operation than at the pre-operative reading.

Table No. 7

## POSTOPERATIVE PERIOD BLOOD PRESSURE

Type	First		High		Low		1 Hour	
	S	D	S	D	S	D	S	D
Brain	91	58	104	61	89	58	101	63
Other Neurosurgery	99	64	111	71	91	61	105	65
Chest	109	69	142	71	103	64	110	66
Gastrectomies	121	71	129	76	116	70	124	73
Other Gastro-intestinal	112	67	122	71	111	65	120	69
Miscellaneous	110	70	116	71	105	66	112	68

The first average postoperative blood pressure recorded when the patients arrived in their rooms was consistently lower in all types of cases than the last pressure recorded in the operating room. The fall in systolic pressure ranged from 2 to 13 points, which occurred in the other neurosurgery group. The greatest diastolic fall was 4 points.

This slight to moderate fall is as would be expected and there is little doubt but what transporting the patient from operating table to stretcher and from stretcher to bed, etc. plays an important role in causing this decrease in pressure.

The highest systolic blood pressure in the first hour is 104 for brain cases and 111 to 142 for other types, with diastolic pressure of 61 for brain cases and 71 to 76 for other types.

The lowest average systolic blood pressure is seen in the brain cases with systolic of 89 and diastolic of 58. The other groups range from a systolic of 91 to 120 with a diastolic of 61 to 70.

The average of the lowest blood pressures occurring at any time during the first hour postoperatively was at a remarkably favorable level. The lowest average systolic blood pressure was 89 and occurred in the group of brain cases. This figure of 89, however, does not compare unfavorably with the average systolic pressure of 100 in the brain cases at the end of the operative procedure. It shows that the average systolic pressure drop was only 11 points. The diastolic

fall was only 4 points in the group of brain cases. The other neurosurgery group showed the greatest fall in blood pressure from the time they left the operating room to the lowest blood pressure recorded during the first hour postoperatively. In this group there was a fall from 112 systolic and 66 diastolic to 91 systolic and 61 diastolic. A drop of 21 points systolic and 5 points diastolic. The other groups ranged from a systolic pressure of 112 to 123 with diastolic of 60 to 71 at the end of the operation. The lowest average pressure for these groups during the first hour postoperatively ranged from a systolic of 103 to 116 and a diastolic of 64 to 70.

We occasionally hear that patients have a marked fall in blood pressure after being returned to their room. These figures would indicate that the drop in pressures, on the average, is by no means near a critical level. In fact, it is amazing that there is such uniformity in the average pressures taken at the end of the surgical procedure and the average lowest pressure recorded at any time during the first hour postoperatively.

The pressure at the end of the first hour shows improvement in all types of cases over the lowest pressure postoperatively. And in brain, gastrectomies and other gastro-intestinal cases the pressure at the end of the first hour was better than the last pressure taken in the operating room. They range from 101 over 62 for brain cases to 124 over 73 for gastrectomies. It is interesting to

note that this pressure at the end of one hour for gastrectomies is higher than the

average preoperative pressure for the same group.

Table No. 8

AVERAGE AMOUNT OF FLUIDS GIVEN PER CASE

Group	Total No. Cases	Saline		Glucose		Plasma		Blood		Total	
		No. Cases	Avg. cc.								
Brain	46	45	787	9	305	6	1025	38	630	46	1481
Other Neuro- surgery	36	31	633	0	0	4	425	17	541	31	1058
Chest	14	14	646	1	50	12	730	7	593	14	1570
Gastrectomies	112	112	625	63	508	107	661	9	1000	112	1674
Other Gastro- intestinal	95	92	598	15	660	75	632	11	491	92	1274
Miscellaneous	82	46	579	6	425	17	534	26	565	46	1140

As to the fluids given during operation it was found gastrectomy and other gastro-intestinal cases were the only ones receiving glucose to any appreciable extent. None of the other neuro-surgery group and only one chest case received glucose. Practically everyone was given physiological saline except in the miscellaneous group where only slightly over 50% of the cases received saline. The gastrectomies, chest and other gastro-intestinal cases were the groups which received plasma in a fairly large percentage of cases.

The number of cases receiving blood in the various groups is interesting. Of a total of 46 brain cases 38 received blood while in a total of 112 gastrectomies only 9 cases received blood. When blood was given to gastrectomy cases, however, it was given in larger quantity, the average case receiving 1000 cc. as compared to 491 to 630 cc. per case in the other groups. The average total amount of fluids received per case varied from 1058 cc. in the other neuro-surgery groups to 1674 cc. in the gastrectomy group.

Of the brain cases receiving fluids the average amounts given were as follows: saline 787 cc., glucose 305 cc., plasma 1025 cc., blood 630 cc., a total of 1481 cc. Other neuro-surgery cases averaged: saline 633 cc., no glucose, plasma 425 cc., blood 541 cc., a total of 1058 cc. Chest

cases received: saline 646 cc., glucose 50 cc., plasma 730 cc., blood 593 cc., average 1570 cc. Gastrectomies averaged: saline 625 cc., glucose 508 cc., plasma 661 cc., blood 1000 cc., average 1675 cc. Other gastro-intestinal cases averaged: saline 598 cc., glucose 660 cc., plasma 632 cc., blood 491 cc., total 1274 cc. Miscellaneous cases received: saline 579 cc., glucose 425 cc., plasma 534 cc., blood 565 cc., total 1140 cc.

There is no doubt that the favorable blood pressure picture is largely due to the liberal use of fluids of all kinds. Judging from the blood pressure picture there has been ample use of fluids. The prophylactic and immediate use of fluids to support the patient's vascular system is of extreme importance and should be realized by all.

Other factors which we feel are important are premedication, the selection of the anesthetic agent best suited to the individual case, and the method of administration. The usual premedication is rather light (morphine sulphate gr. 1/6, hyoscine hydrobromide gr. 1/200). The greatest difficulty we encounter with premedication here is the difficulty in the correct timing. For instance, it is customary to write orders for the preoperative medication to be given when the patient is called to the operating

room. One patient may receive his medication subcutaneously, be brought up and wheeled right into the operating room, and about all the effect he has had time to get is the excitement caused by the stick of the hypodermic needle. Another patient may receive his preoperative medication and be detained 2 to 3 hours, and by the time he does get into the operating room the desired effect of the medication has vanished completely. We feel that our preoperative medication here could be handled most satisfactorily by giving it intravenously just before the patient goes into the operating room. By this method one could give the amount required to produce the physiological effect at the time it is desired. An increasing amount of our premedication is being given in this manner.

The many advantages of cyclopropane are well known and it is being used with increasing frequency. It allows a high oxygen percentage which is essential in some patients and desirable in all. The use of controlled respiration is another important factor. It maintains an adequate exchange of gases, removed the effort of breathing, thus aiding both the surgeon and the patient and allowing the anesthetist to maintain a lighter plane of anesthesia with an adequate degree of relaxation.

Table No. 9

## POSTOPERATIVE COMPLICATIONS

	Previous Survey		Present Survey	
	No.	%	No.	%
Pulmonary Complications	34	7	35	9
Pulmonary Complications (recovered)	25	5	32	8
Pulmonary Complications (died)	9	2	3	0.7
Deaths from Non-pulmonary Complications	54	12	32	8

Table No. 10

## POSTOPERATIVE PULMONARY COMPLICATIONS

	Previous Survey		Present Survey	
	No.	%	No.	%
Bronchopneumonia	12	35	13	37
Atelectasis	9	26	11	31
Pneumonitis	2	6	1	3
Pulmonary Edema	2	6	1	3
Pneumonia	3	9	4	11
Pulmonary Emboli	4	12	2	5.5
Miscellaneous	2	6	3	8.5
Total	34		35	

In the previous survey there were 34 pulmonary complications or 7% of all cases as compared with 35 pulmonary complications or 9% of all cases in the present survey. In the previous survey 2% died and 0.7% in the present survey died. Death from non-pulmonary complications in the first survey numbered 54 or 12% as compared to 32, or 8%, in the present survey. The pulmonary complications consisted of 37% bronchopneumonia, 31% atelectasis, 3% pneumonitis, 3% pulmonary edema, 11% pneumonia, 5.5% pulmonary emboli and 8.5% miscellaneous complications. The differences in the percentages of the various types of pulmonary complications do not appear great enough to enable one to arrive at a very definite conclusion.

We still feel that atelectasis has a higher incidence than these figures indicate. We try to reduce the incidence of atelectasis which may be promoted by an anesthetic by the use of helium at the end of the operation, also by removing any secretions present in the tracheo-bronchial tree by means of a suction catheter through the intratracheal tube. Bronchoscopy is occasionally used, and we attempt to have the patient awake as soon as possible after completion of the operation.

We feel that having the patient as nearly awake as possible at the completion of the operation will enable the patient to rid himself of secretions that might enter the tracheobronchial tree and tend to produce atelectasis in many instances. In other words the sooner the patient has his reflexes returned after surgery has been completed, the better it will be for him.

Because of the great increase in the number of cases receiving spinal anesthesia in this survey as compared to the first survey we thought it might be of interest to include the technique of administration of the spinal anesthetic agents used.

It should be held in mind that perhaps the most frequent indication for spinal anesthesia is the need for muscular relaxation in operations in the abdomen.

In selecting the agent and the method of spinal anesthesia for a given case many factors must be considered. Probably the first consideration after spinal anesthesia has been selected, is the estimated time required, as different drugs and techniques produce anesthesia for varying periods of time. The position in which the patient is to be on the operating table also influences the selection of the agent. The site of operation influences both choice of agent and method as the anesthesia for a hemorrhoidectomy will not suffice for a gastric resection or cholecystectomy.

Since all of the cases in this series needed good muscular relaxation and were three hours or more in duration it was thought best to use the spinal anesthetic agent having the most prolonged action; namely, nupercaine. Nupercaine gives anesthesia of from 3 to  $4\frac{1}{2}$  hours in duration.

The position of the patients in this series of cases fell into two general classes. First, a supine position with not more than a slight to moderate degree of Trendelenburg position for the first 30 minutes, and secondly, a very steep Trendelenburg position being required from the beginning as in case of a com-

bined abdomino-perineal operation.

Nupercaine 1:1500 in 3% dextrose was used in practically all cases requiring not more than slight to moderate Trendelenburg position during the first 20 to 30 minutes after induction. Nupercaine 1:1500 in 3% dextrose gives a solution which is hyperbaric, or heavier than spinal fluid, and will tend to gravitate downward. The spinal puncture was performed in the usual manner, with the patient lying on his left side, head and thighs acutely flexed, most commonly between the second and third lumbar vertebrae and the anesthetic solution injected at the rate of  $\frac{1}{2}$  cc. per second. The patient was immediately placed in the supine position with head and neck acutely flexed, care being exercised to keep the head in this position constantly, and the table adjusted to give about ten degrees Trendelenburg position. The height of anesthesia was closely watched and if anesthesia began to develop higher than the fifth thoracic segment the table was leveled off and if anesthesia seemed particularly slow in reaching the desired height more Trendelenburg position was given, watching carefully the progress of the height of anesthesia. Using this technique, anesthesia to the 5th or 6th thoracic segment is the level usually obtained.

The technique employed in the group requiring steep Trendelenburg position immediately after induction consisted in using nupercaine 1:1500 in 0.5% saline solution. This anesthetic solution is hypobaric or lighter than spinal fluid and will tend to rise within the spinal canal.

The spinal puncture was done with the patient lying on his left side and the table level. The site of the puncture varied somewhat with the level of anesthesia desired, but was usually between the 2nd and 3rd lumbar vertebrae. The patient was then placed in the supine position, being careful that the head was not raised and the amount of Trendelenburg position given necessary for the type of operation being done.

There was liberal use of vasopressor

medication with both techniques of spinal anesthesia. The usual procedure was to give 50 mgms. of ephedrine intramuscularly just before the spinal puncture was made, the blood pressure level being watched very carefully, particularly during the first half hour as it is within this time that the most serious and rapidly occurring effects of spinal anesthesia are apt to occur.

If the blood pressure did not maintain a satisfactory level following administration of the initial 50 mgms. of ephedrine, then a mixture containing ephedrine 5%, 0.8 cc., and neo-synephrine 1%, 0.2 cc., was given in from 0.1 cc. to 0.5 cc. amounts depending upon the extent and rapidity of the blood pressure drop. Occasionally it was necessary to use 0.1 cc. of this mixture intravenously for rapid falls in blood pressure. Experience in this department with mixtures of various proportions of ephedrine and neo-synephrine has led to the conclusion that the blood pressure may be more evenly maintained by the use of ephedrine and neo-synephrine in the above proportions. Cases receiving spinal anesthesia in the present survey were given an average of 80 mgms. ephedrine plus 1.7 mgms. neo-synephrine.

Recently we have been using "intocostrin," a purified extract of curare prepared by E. R. Squibb which seems to give complete muscular relaxation of the voluntary musculature, enables the surgeon to have excellent exposure and permits the anesthetist to carry the patient in a very light plane of anesthesia, with good pulmonary ventilation and have the patient awake by the time he is returned to his room. This drug shows many possibilities such as giving relaxation comparable to that obtained from spinal anesthesia without the undesirable fall in blood pressure often seen with spinals. Also it enables patients to be carried lighter. We believe the incidence of catheterization which is fairly common after spinal anesthesia will be decreased. We hope it may prove to be a means of decreasing the pulmonary complications. It is most fortunate that its use here comes after the conclusion of this survey so that a later survey may prove most interesting.

I wish to express my thanks to the members of the anesthesia staff who assisted in compiling this data.

V. GOSSIP

Sunday, enroute to Chicago. Train leaves at 8, and is well filled. Breakfast in the diner to learn later that the standard morning meal is now \$1. Bacon if available, if not, it is potatoes. The Mississippi River is high and has covered the low country up to the tracks. Many people go to sleep as soon as they get on a train. I admire their comfort although they usually look as if they are uncomfortable. We are now passing thru country which has had too much rain. I am told the farmers are not able to get into the fields to plant corn. There is an old saying that one shouldn't go into the garden if mud cakes on the shoes. The train is completely filled as we near Chicago. To dinner at the Harvey restaurant, still serving the same extra good meals at moderate prices. The station is full of the military and accompanying civilians. Crowds clog gates as train time approaches. On the Pennsylvania bound for New York, there is a brake dragging on our car which stops the train. As we start again we lose the belt from the generator. An electric line to the car ahead supplies both of us with dim light. The lady downstairs, yes, I have an upper and I was glad to get it, asked a lot of questions about this and that and finally intimated that I had a familiar voice which disturbed her peace on Saturday morning via radio. The couple across the aisle are newlyweds. He is a first louie from Davenport (medical corps). He has been with ski troupes and has just received his ticket for the big boatride. Finally to bed and a long restful sleep.

Monday - passing through Pennsylvania's lovely countryside. Pennsylvania and New York state are two spots for the traveler. The Philadelphia papers have a flavor all their own. I read that police pick up benders. Benders are youngsters who steal cars for quick, speedy joy rides and then abandon them. These benders met a fatal end as in trying to run down a policeman on a sidewalk they ran into a wall. A woman has committed suicide and for the occasion has dressed in her very best. She applied make-up and put every hair in place, re-made the bed and tidied the room. Psychiatrists tell us that a real suicide victim dislikes to make an unfavorable impression. This is especially true of young people. Here is the tale of a six year

old boy who cut his foot on a glass bottle one week ago and is now dead of tetanus. This is highly fatal disease if it develops so quickly. Sad news of the death of Dr. James Ewing, father of the movement to foster accurate diagnosis and treatment of cancer. A widower for years, his only son is in service. His list of honors and distinction is long and noteworthy. For years he suffered with painful neuralgia. He died after seeing his dream of a home for Memorial Hospital realized. We arrive in Pennsylvania station so quickly. One appreciates the thought and effort spent in expediting traffic in and out of New York. On the avenue just as the noonday crowd is out for stroll. To the University Club to meet with officials of the Commonwealth Fund to express appreciation for financial assistance and encouragement for our program in Postgraduate Medical Education for the past 5 years and to discuss plans for future. The foundations are having their difficulties like everyone else. It is still one of the most difficult problems to spend accumulated wealth wisely and efficiently. To dinner at the club and the dining room looks like a page out of the New Yorker, with the various specimens playing their accustomed roles. The gloomiest of all is a general who looks neither to the right nor the left with the saddest face I have ever seen. The library has an amazing collection of books and periodicals, with an efficient librarian in charge; collections of Mexican art and other interesting objects, including deck plates from various battleships. To Grand Central Station where a wait of an hour is pleasantly employed watching the people. There is a newsreel theatre for those who like this sort of entertainment. I spent some time looking into a window decorated for Father's Day. It was completely filled with knives of every sort. The featured article was a little clipper for clearing the nose and ears of brush. Many clerks in New York stare at you with a dead pan face as if to avoid human recognition, others grunt or holler, including the man at the coffee counter, who looked into space and screamed "Hey" when a new customer came in. Some of them may have been hucksters

before they were clerks. Military uniforms may look spic and span for review purposes but on travelers they represent the last word in slouchiness. The Navy nurses in their whites have the snappiest uniforms. It has been warm all day. The vegetation is well advanced. They are canning rhubarb in the country and the gardens are already producing. On the New York Central up the Hudson to Albany and even at night with many lights dimmed it is one of our most interesting train rides. To deep sleep and another good night. Tuesday - Buffalo in gloom, fog and rain. Our train is now passing through Canada and everything is cold and drippy. People stare from the windows through this long dreary ride. There is only one stop before Windsor. Off at Detroit to confer on educational matters. Detroit is busy as usual and the streets are filled with cars in every kind of parking place. Factories run day and night. The city seems tired, with little opportunity to clean up and put things in order. Everyone talks big and loud. The favorite conversation is women, this time about women in industry. Everyone agrees they produce more parts and especially small parts than men. One factory executive said with women for speed and older men for precision, he could get more work done than ever before. He was critical of the young male worker, who loafes so much and does not have the same attitude as women and older men. Women were more difficult to manage but now women supervisors have been put in and results are much better. Late at night in drizzling rain to Chicago. Wednesday - Up early as train arrival is at 7. A good walk before breakfast. To the American Medical Association to see Dr. Jordan about standard Nomenclature of Disease and Operations. Reading this index is one of the most fascinating occupations. Each part of the body is logically numbered. Each disease is classified as to etiology. In order to use the system physicians must make accurate diagnosis. The use of the standard nomenclature is a "must" for every physician for it teaches him to think each diagnosis through. Dr. Jordan also edits queries and minor notes which he compiles into book at periodic intervals. He finds the greatest interest in medicine today in that phase which con-

cerns accurate diagnosis and treatment. There are no questions of any sort on operative technique. To visit Dr. Westmoreland and to speak of Occupational Therapy. University of Minnesota plans to offer a course in this field. The implications are broad for we learn that occupational therapy is "any activity, mental or physical, prescribed by a physician for its remedial value." "The objects sought are to arouse interests, courage and confidence; to exercise mind and body in healthy activity; to overcome disability; to re-establish capacity for industrial and social usefulness." "Physically, its function is to increase muscle strength and joint motion as well as to improve general bodily health." "Mentally, its function is to supply as nearly as possible normal activity through avocational projects, and prevocational studies and training." The course would be four years and a B.S. degree is to be given. Much of the training will be given in creative arts and the last year will be spent on an internship. Neuro-psychiatry, orthopedics, tuberculosis, children's diseases, and general hospital services. To Dr. Peterson, our own Minnesota Pete, about industrial health. Medical schools are now adopting training programs in this field. In the past it was considered a full time specialty and it still is for some men. On the other hand every physician must be prepared to develop and carry on the program in a small place which cannot employ a full time physician. It may be the doctor on the corner who will spend a few hours at the plant in his neighborhood. Courses are now being planned in continuation study to enable more men to qualify. To lunch at the Palmer House in the Victorian Room with good friends. Illinois State Medical Association is in session and many important looking people are wearing badges. An afternoon of good talk and another brisk walk in the rain to the 4 o'clock train. Again along our delightful Mississippi for many miles, and now home. It is good to travel and meet with men at work in their own places, to observe the common interest of men in medicine to improve the service and to investigate the unknown. Little war talk as such but much concern over probable length of conflict and job of peace ahead.