

Anesthesias Administered in the Hospitals of the State of New Jersey: A Survey.*

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SOME MONTHS AGO, Dr. Gaston Labat, President of the American Society of Regional Anesthesia, appointed a committee to make an analysis of anesthetics administered in the hospitals in the State of New Jersey. This Committee prepared a questionnaire which was distributed to both private and public hospitals located throughout the State. The report which follows has been developed from the answers obtained as a result of this canvass. It includes information relative to the various types of General and Regional Anesthetics in use, the person responsible for their administration, and the resultant deaths incurred. The data presented in this survey are for the year 1930.

QUESTIONNAIRE

1. Is a physician anesthetist in charge of the department?
2. Are internes instructed in anesthesia?
3. Are there any nurse anesthetists employed?
 - A. *General Anesthesia*
 - a. Ether
 - b. Gas-Oxygen
 - c. Gas-Oxygen-Ether
 - d. Ethylene
 - e. Avertin
 - f. Sodium Amytal
 - g. Rectal
 - h. Miscellaneous: such as,—Chloroform, Anesthol, A.C.E., etc.

Number of General Anesthetics Administered in 1930	Type	Administered by			No. of Deaths	
		Attending Anesthetist	Interne	Nurse	Immediate	Remote
	a.					
	b.					
	c.					
	d.					
	e.					
	f.					
	g.					
	h.					
	Total					

In Case of Death

Remarks by anesthetist:

- B. *Regional Anesthesia*
 - A. *Spinal Anesthesia*:
 1. Neocain
 2. Spinocain
 3. Supercain
 4. Nupercain
 5. Miscellaneous drugs, such as, Stovain, etc.
 - B. *Other Methods of Regional Anesthesia*:
 1. Nerve Block
 2. Field Block

*Read before the American Society of Regional Anesthesia at its stated meeting of December 8, 1931, New York Academy of Medicine.

When the term neocain is used it means novocain as there was very little neocain used. Neocain and novocain are used as one.

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3. Sacral Block
4. Miscellaneous

Number of Regional Anesthesias Admin- istered in 1930	Type	Administered by			No. of Deaths	
		Attending Anesthetist	Surgeon or Assistant	Interne	Immediate	Remote
	A.1					
	A.2					
	A.3					
	A.4					
	A.5					
	B.1					
	B.2					
	B.3					
	B.4					
	Total					

1. In Case of Death

1. Dose of drug used
 2. Height of anesthesia
 3. Time of death after injection
 4. Remarks about case (anesthetist).
2. Does a competent person remain at head of patient during anesthesia?
 Doctor? Or Nurse?

Data Collected

IT IS INTERESTING to note that although 85 questionnaires distributed only 23 were filled out and returned. One of these, however, had to be eliminated from the study, owing to the incompleteness of the information furnished. Of the hospitals returning the questionnaires 87% have been approved by the American College of Surgeons, while 13% have not been approved.

It is to be regretted that from one of the principal counties in New Jersey, a county in which all of the hospitals have been approved by the American College of Surgeons, not a single institution, after receiving repeated requests, returned the questionnaires. Is this due to carelessness, or disinterestedness, or are the records in this connection such that too much labor would be entailed to compile this data, or are the data available at all?

Type of Anesthetists.—To the first query put forth in the questionnaire: "Is a physician anesthetist in charge of the department?", 68.42% of the approved and 66.66% of the unapproved hospitals answered in the affirmative. These figures may, however, be slightly inaccurate since one hospital although admitting having a physician anesthetist in charge, its questionnaire further indicated that all anesthetics were administered by nurses. In other words,

the Chief Physician Anesthetist was merely a figure head in this instance. Similar conditions may exist and probably do exist in other hospitals. Another institution responded that although they had an anesthetist in charge, that some surgeons preferred to use their own nurses especially trained in this work.

Interne Instruction.—The second question pertaining to the instruction of internes in the administration of anesthetics disclosed the fact that only 50% of the hospitals furnished such instruction; classified according to type, 66 2/3% were unapproved hospitals and 47.369% approved. Is this not a small percentage of approved hospitals where-in instruction of this kind is offered to internes?

As regards the third question, "Are any nurse anesthetists employed?", fifty-nine per cent of the hospitals answered "yes", of these 92% were approved and 8% unapproved. Without any statistics on hand to prove the contention, it is a well-known fact that nurses, as anesthetists, are on the increase. Is this due to the fact that women are by nature better adapted in the art of anesthesia than men, or is it because the physician administers anesthetics only as a stepping stone to surgery or some other specialty and does not intend to continue as an anesthetist when he has reached his goal;

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or, can it be for economical reasons which increase the income of the institution as well as that of the surgeon?

General Anesthetics

A REVIEW of Table I, which follows, shows that the nurses not only administer more general anesthetics than internes but also more than attending anesthetists.

It will also be noted from this table that the anesthetics reported were administered in the following ratio: nurse anesthetists, 40.175%; attending anes-

thetists, 31.158%; interne anesthetists, 28.666%. Considering the death rate, it will be seen that, that of the nurse anesthetist is 35.67% greater than that of the attending anesthetist, while the interne's death rate is 253.65% greater than that of the attending anesthetist.

An examination of Table II reveals the popularity of the General Anesthetics used, in the following order: beginning with gas-oxygen-ether, which is the most frequently used, then ether, gas-oxygen, ethylene, miscellaneous,

TABLE I
General Anesthetics
Administered during 1930 in 22 New Jersey Hospitals

<i>Administered by</i>	<i>Number of Anesthetics Administered</i>	<i>Per cent of total</i>	<i>Number of Deaths</i>	<i>Death Rate</i>
Attending Anesthetist	12,177	31.158%	4	.000328%
Interne Anesthetist	11,203	28.666%	13	.001160%
Nurse Anesthetist	15,701	40.175%	7	.000445%
Total	39,081		24	.000614%

TABLE II
General Anesthetics Classified As to Type

<i>Type of Anesthesia</i>	<i>Number of Anesthetics Administered</i>	<i>Per cent of Total</i>	<i>Number of Deaths</i>	<i>Death Rate</i>
a. Ether	12,447	31.8492%	14	.001124%
b. Gas-Oxygen	6,778	17.3434%	3	.000442%
c. Gas-Oxygen-Ether	17,093	43.7373%	6	.000351%
d. Ethylene	1,666	4.2629%	—	None
e. Avertin	239	.6115%	1	.004184%
f. Sodium Amytal	50	.1279%	—	None
g. Rectal	32	.0818%	—	None
h. Miscellaneous	776	1.9856%	—	None
Total	39,081		24	.000614%

TABLE III
General Anesthesia
Administered by the Attending Anesthetist

<i>Type of Anesthesia</i>	<i>Number of Anesthetics Administered</i>	<i>Per cent* of Total by Types</i>	<i>Number of Deaths</i>	<i>Death Rate</i>
a. Ether	2,131	17.12%	—	None
b. Gas-Oxygen	2,360	34.82%	1	.000423%
c. Gas-Oxygen-Ether	6,689	39.13%	2	.000298%
d. Ethylene	396	23.76%	—	None
e. Avertin	204	85.35%	1	.004901%
f. Sodium Amytal	35	70.00%	—	None
g. Rectal	24	75.00%	—	None
h. Miscellaneous	338	43.55%	—	None
Total	12,177	31.15%	4	.000328%
		All Types		

*Per cent of total of each type of anesthetics administered by attending anesthetists, internes, and nurses.

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avertin, sodium amyral, and ending with rectal anesthesia, which is more rarely administered. This table also indicates that the death rate ranges from nil to .001124%, in the following order: ethylene, none; sodium amyral, none; rectal, none; miscellaneous, none; gas-oxygen-ether, .000351% gas-oxygen, .000552%; ether, .001124%; which has the highest mortality.

A consideration of *Tables III, IV, and V*, discloses for all practical purposes that; *firstly*, the nurse anesthetist gives the greatest number of anesthetics, except where avertin, sodium amyral, and rectal anesthetics are employed, (the attending anesthetist exceeds in this group, which as will be noted from the tables are the anesthetics most seldom used); *secondly*, the attending anesthetist has the lowest mortality; *thirdly*, although the interne anesthetist gives the least number of anesthetics, he has the highest mortality and ether is the anesthesia of

which he usually makes use. As regards the administration of General Anesthesia, the trained physician anesthetist should be used in preference to all others, or in the event that this cannot be done, it is better to advocate the use of the nurse anesthetist, rather than the interne anesthetist.

Regional Anesthetics

AS REGARDS Regional Anesthetics, it was reported that for 10,758 administered, there was a mortality of 14, giving a death rate of .00130%. Of this number the attending anesthetist gave 3,069, or 28.5276%, with a mortality of 7, making a death rate of .00228%; the attending surgeon, 7,020, or 65.2537%, with a mortality of 7, and a death rate of .000997%; the interne anesthetist, 669 anesthetics, or 6.2186%, with no mortality.

It will be seen from *Table VI* that the anesthetics administered were in the following ratio: surgeon anesthetists, 65.2537%; attending anes-

TABLE IV
General Anesthesia
Administered by the Interne Anesthetist

<i>Type of Anesthesia</i>	<i>Number of Anesthetics Administered</i>	<i>Per cent of Total by Types</i>	<i>Number of Deaths</i>	<i>Death Rate</i>
a. Ether	5,897	47.37%	11	.001865%
b. Gas-Oxygen	1,523	22.46%	2	.001313%
c. Gas-Oxygen-Ether	3,463	20.25%	—	None
d. Ethylene	120	7.202%	—	None
e. Avertin	24	10.0418%	—	None
f. Sodium Amytal	15	30.00%	—	None
g. Rectal	2	6.25%	—	None
h. Miscellaneous	159	20.48%	—	None
		All Types		
Total	11,203	28.66%	13	.001160%

TABLE V
General Anesthesia
Administered by the Nurse Anesthetist

<i>Type of Anesthesia</i>	<i>Number of Anesthetics Administered</i>	<i>Per cent of Total by Types</i>	<i>Number of Deaths</i>	<i>Death Rate</i>
a. Ether	4,419	35.50%	3	.000678%
b. Gas-Oxygen	2,895	42.71%	—	None
c. Gas-Oxygen-Ether	6,941	40.60%	4	.000576%
d. Ethylene	1,150	69.02%	—	None
e. Avertin	11	4.60%	—	None
f. Sodium Amytal	—	—0—	—	None
g. Rectal	6	18.75%	—	None
h. Miscellaneous	279	35.95%	—	None
		All Types		
Total	15,701	40.17%	7	.000445%

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thetists, 28.5276% interne anesthetists, 6.2186%. This table also indicates that the surgeon anesthetist has a lower mortality than the attending anesthetist, and the interne anesthetist no mortality.

A comparison of General Anesthetics with Regional Anesthetics as brought out in *Table VII* reveals that of the two groups General Anesthetics are more frequently used, or in 78.414% of the cases, while Regional Anesthetics are employed in 21.585% of the cases. The mortality rate for General Anesthetics is .000687% or 52.8055% lower than that for Regional Anesthetics.

Table VIII illustrates the frequency

of use of the various kinds of Regional Anesthesia employed. They may be listed as follows, according to their popularity:

1. Nerve Block
2. Spinal Neocain
3. Field Block
4. Spinal Spinocain
5. Miscellaneous (B)
6. Sacral Block
7. Miscellaneous Spinal
8. Nupercain
9. Supercain

It should be mentioned however, that although Nerve Block heads the list as the anesthesia in this group most often administered, it is in this position

TABLE VI
Regional Anesthetics—All Types
Administered during 1930 in 22 New Jersey Hospitals

<i>Administered by</i>	<i>Number of Anesthetics Administered</i>	<i>Per cent of Total</i>	<i>Number of Deaths</i>	<i>Death Rate</i>
Attending Anesthetist	3,069	28.5276%	7	.00228%
Surgeon Anesthetist	7,020	65.2537%	7	.000997%
Interne Anesthetist	669	6.2186%	—	None
Total	10,758		14	.00130%

TABLE VII
General As Compared With Regional Anesthetics

<i>Type of Anesthesia</i>	<i>Number of Anesthetics Administered</i>	<i>Per cent of Total</i>	<i>Number of Deaths</i>	<i>Death Rate</i>
General Anesthetics	39,081	78.414%	24	.000614%
Regional Anesthetics	10,758	21.585%	14	.001301%
All Types				
Total	49,839		38	.000762%

TABLE VIII
Regional Anesthesia
Administered By Attending Surgeon, and Interne Anesthetist

<i>Type of Anesthesia</i>	<i>Number of Anesthetics Administered</i>	<i>Per cent of Total</i>	<i>Number of Deaths</i>	<i>Death Rate</i>
<i>A. Spinal Anesthesia</i>				
1. Neocain	2,683	24.939%	11	.004099%
2. Spinocain	1,564	14.538%	3	.001918%
3. Supercain	27	.250%	—	None
4. Nupercain	40	.371%	—	None
5. Miscellaneous drugs, such as Stovain, etc.	46	.427%	—	None
<i>B. Other Methods</i>				
1. Nerve Block	2,840	26.398%	—	None
2. Field Block	2,112	19.632%	—	None
3. Sacral Block	591	5.493%	—	None
6. Miscellaneous	855	7.947%	—	None
Total	10,758		14	.001301%

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merely because practically all of those reported were given by one hospital. *Table VIII* also indicates that the death rate ranges from nil to .004099%, in the following order: nerve block, none; field block, none; miscellaneous (B), none; sacral block, none; nupercain, none; supercain, none; spinocain, .001918% neocain, .004099%; which has the highest mortality. In considering Regional Anesthesias, there is no doubt but that the mortality rate for this group would be greatly reduced if nerve and field block were administered in preference to spinal anesthetics.

A study of *Tables IX, X, and XI* shows that the attending anesthetist

administers the most spinal anesthetics, while the surgeon anesthetist gives the most nerve and field blocks.

Deaths.—The question of remote deaths will have to be disregarded at this time, as only one institution furnished any information in this connection. As to the question of immediate deaths, while under General Anesthesia, the fatalities listed were incurred in connection with operations for appendicitis with peritonitis, thyroidectomy, tracheotomy, intestinal obstruction, sarcoma of femur, and so forth. In reporting the cause of death in these instances the terms cardiac dilation, status lymphaticus, embolus, moribund,

TABLE IX
Regional Anesthesia
Administered by the Surgeon Anesthetist (See *Tables X and XI*)

<i>Type of Anesthesia</i>	<i>Number of Anesthetics Administered</i>	<i>Per cent of Total by Types</i>	<i>Number of Deaths</i>	<i>Death Rate</i>
<i>A. Spinal Anesthesia</i>				
1. Neocain	564	21.0216%	4	.007092%
2. Spinocain	926	59.2071%	3	.003239%
3. Supercain	16	59.2592%	—	None
4. Nupercain	—	—	—	None
5. Miscellaneous drugs, such as Stovain, etc.	41	89.1304%	—	None
<i>B. Other Methods</i>				
1. Nerve Block	2,790	98.2394%	—	None
2. Field Block	1,966	93.0871%	—	None
3. Sacral Block	8	1.3536%	—	None
4. Miscellaneous	709	82.9339%	—	None
Total	7,020	All Types 65.2537%	7	.000997%

TABLE X
Regional Anesthesia
Administered by the Attending Anesthetist

<i>Type of Anesthesia</i>	<i>Number of Anesthetics Administered</i>	<i>Per cent of Total by Type</i>	<i>Number of Deaths</i>	<i>Death Rate</i>
<i>A. Spinal Anesthesia</i>				
1. Neocain	1,748	65.1509%	7	.004004%
2. Spinocain	575	36.7640%	—	None
3. Supercain	11	40.7407%	—	None
4. Nupercain	40	100.00%	—	None
5. Miscellaneous drugs, such as Stovain, etc.	5	10.8695%	—	None
<i>B. Other Methods</i>				
1. Nerve Block	15	.5281%	—	None
2. Field Block	96	4.5454%	—	None
3. Sacral Block	579	97.9695%	—	None
4. Miscellaneous	—	—	—	—
Total	3,069	All Types 28.5276%	—	.002280%

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TABLE XI
Regional Anesthesia
Administered by the Interne Anesthetist

<i>Type of Anesthesia</i>	<i>Number of Anesthetics Administered</i>	<i>Per cent of Total by Type</i>	<i>Number of Deaths</i>	<i>Death Rate</i>
A. Spinal Anesthesia				
1. Neocain	371	13.8274%	—	None
2. Spinocain	63	4.0281%	—	None
3. Supercain	—	—	—	—
4. Nupercain	—	—	—	—
5. Miscellaneous drugs, such as Stovain, etc.	—	—	—	—
B. Other Methods				
1. Nerve Block	35	1.2323%	—	None
2. Field Block	50	2.3674%	—	None
3. Sacral Block	4	.6768%	—	None
4. Miscellaneous	146	17.0760%	—	None
Total	669	All Types 6.2186%	—	None

enlarged thymus, surgical shock, toxic, were used. As regards the mortality rate for Regional Anesthesia, the conditions for which the patients were operated upon were not indicated. The dosage for spinal anesthesia ranged from 110 mgm. to 240 mgm. The injections were given between the first and fourth lumbar and death took place within ten to forty-four minutes.

As to the question: "Does a competent person remain at the head of the patient during anesthesia? Doctor? Or Nurse?", the answers were in the affirmative in all instances. The nurse remains at the head of the patient in 59.05% of the cases and the doctor in 40.95%. However, this percentage does not give an accurate picture, for where the surgeon acts as his own anesthetist, as when Regional Anesthetics are employed, the nurse remains at the head of the table.

Summary and Conclusions

FIRST. More complete and accessible anesthesia records should be kept. 2. Only 67½% of the hospitals have a physician anesthetist in charge. A physician anesthetist should be in charge of the department regardless of whether nurse anesthetists are employed or not. He should have complete charge of this department with the same rights and authority as heads of other departments, and not act merely as a figure head.

3. Only 50% of the hospitals give instructions to internes. Provision should be made to give such instructions in all hospitals.

4. Fifty-nine per cent of the hospitals employ nurse anesthetists. There is a large field here for competent male anesthetists. More physicians should undertake this specialty.

5. Nurse anesthetists administer the largest number of General Anesthetics.

6. The physician anesthetist has the lowest mortality.

7. The nurse anesthetist's mortality is 35.67% greater than that of the physician anesthetist.

8. The interne anesthetist has the greatest mortality, 253.658% greater than the trained physician anesthetist.

9. For the welfare of the patient, more trained physician anesthetists should be employed. If a physician, so trained, is not available for the administration of the anesthesia, it would be to the best interest of the patient to use the trained nurse anesthetist rather than the interne. The interne anesthetist should not be permitted to give anesthetics unless especially trained.

10. General Anesthetics are more frequently used than Regional Anesthetics or, in 78.414% of the cases.

11. General Anesthetics have a lower mortality rate than Regional Anesthetics, 52.8055% lower.

12. Spinal neocain is actually the most frequently used anesthesia in the Regional Group, while gas-oxygen-ether is in the General Anesthesia class.

13. Spinal neocain has a 1067.80%, or more than ten and a half times greater mortality than gas-oxygen-ether, which proves that spinal neocain should not be indiscriminately administered. If

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more use were made of nerve and field block, the mortality rate for Regional Anesthetics would drop.

14. There is a big field for the Regional anesthetist. No doubt, if more physicians were to undertake this as a specialty, the surgeon anesthetist, who now gives most of these anesthetics himself, would be relieved of this burden, with the result that the mortality rate from anesthetics would be likely to decrease considerably. It is also quite likely that Regional Anesthetics would be more frequently resorted to, if

specialists were available for this purpose.

15. Only 40.95% of the hospitals have a physician at the head of the patient. While Regional Anesthetics are being given, a physician anesthetist should be at the head of the table, rather than a nurse or interne. In fact, the ideal situation would be one in which a well-trained physician anesthetist should give all anesthetics, both General and Regional.

2765 HUDSON BOULEVARD.

Anesthetics Administered in the Hospitals of the State of New Jersey: Critical Review of Survey.*

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THE STUDY OF DR. FRANK BORTONE and his committee on anesthetics administered in the hospitals of the State of New Jersey during 1930 represents, I am convinced, the most important group study presented before the American Society of Regional Anesthesia during the ten year period of its existence.

Conclusions and Recommendations

THE MAJOR CONCLUSIONS and recommendations of the report are clear-cut; 1. Departments of Anesthesia in all hospitals should be headed by specialists, preferably trained physicians anesthetists.

2. Rules regarding the administration of anesthetics should be explicit and exacting.

3. The untrained interne-anesthetist constitutes a serious menace to life. Interne anesthetists as a class have an anesthetic mortality rate which is 253% greater than that of the trained physician anesthetist.

4. Due recognition should be given to the importance of the specialty of anesthesia and surgeons should cooperate to the utmost in the development of departments of anesthesia headed by trained physician anesthetists having rights and authority consistent with their importance to the welfare of the patient. At present only 40% of the hospitals have a trained physician anesthetist at the head of the patient

during the anesthetic phase of the operative ordeal.

Which Anesthetists

DIRECT and effective action should be taken from some quarter to remedy abuses exposed by this report. The survey indicates a steady and certain life toll from the administration of anesthetics and makes clear that human life is being trifled with in any institution in which the anesthetic department falls below adequate standards.

The certainty of some corrective action rests with our ability to give this report the thought and emphasis which its conclusion warrant. Dr. Bortone and his committee have rendered our society a real service in their preparation of this deailed and careful study; and our society, in turn has an opportunity for service in seeking cooperation from every source and at every avenue to put an end to any needless anesthetic mortality rate.

The surgeon often treats the anesthetic as a thing apart. Absorbed with the technical phases of operation itself and with preoperative and postoperative treatment, in all of which he plays the dominant role, the surgeon sometimes comes to treat quite casually the anesthesia, which he does not himself ad-

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minister. It is only after he has had the tragic experience of a sudden death of a private patient, coming even prior to or at the very outset of the operation, that the operator becomes keenly aware of anesthetic problems and takes an insistent interest in them. One quickly learns that the problems concerned in producing insensibility (or insensitivity as the case may be) are almost as technical and complex as those concerned in the operation itself. The large array of drugs, equipment, and optional methods in current use is baffling to any novice and to all but the true expert. Avertin, ethylene, amytal, the barbiturates, nupercain, spinocain, neocain; rectal anesthesia, inhalation narcosis; the closed method, the open method; subarachnoid block, paravertebral block, field block, local infiltration, how can these be mastered or even intelligently judged between, without extended training and specialization? This question is answered beyond room for doubt in the percentage mortality of the various groups now allowed to administer anesthetics; mortality records which irrefutably demonstrate the meaning and value of specialization.

For the surgeon, then, the question has come to be, not "what anesthetic" but "which anesthetist"? The surgeon's conscience cannot remain clear if his anesthetist be inexpert. But if the administrator be one of broad training and wide experience, an expert, the surgeon's anxiety is minimized. While the operator is not directly to blame for an anesthetic death and can, therefore, sidestep the immediate responsibility for such an occurrence, he is nevertheless responsible, in the management of private cases, at least, for the choice of personnel. This report, and others like it, definitely show that by far the lowest mortality rate lies with the trained physician anesthetist.

That the interne has a right to instruction in anesthetic methods is an opinion strongly championed and stressed by our committee; but the right of the interne, when yet untrained, to assume full responsibility for the management and administration of the anesthetic, the figures of this investigation most emphatically deny!! His natural restraints are inadequate. He is unaware of the degree of danger involved. There is no rea-

son to expect that he should possess any practical knowledge as to apparatus, drug, or death rate. And there is little more excuse for allowing the untrained interne to administer the anesthetic without direct and constant supervision than to allow him to perform the operation itself. No excuse as to convenience or economy can justify the continued use of the untrained interne anesthetist. This is perhaps the most valuable lesson of the present survey.

The relative success of the nurse anesthetist serves but to re-emphasize the importance of the element of specialization and training. While the mortality rate of the interne anesthetist is 253% greater than that of the trained physician anesthetist hers is but 35% greater. This testifies to no greater native ability of nurse than of interne. We are all aware that anesthetics are given by only those particular nurses who have gone to considerable pains to qualify themselves for this work and who have had their credentials carefully examined.

In sharp and unfortunate contrast, there are still many institutions in which any medical graduate, without proper regard to qualifications, is allowed to take full charge of anesthetics, both general and regional. This is a particularly pernicious thing when closed methods of anesthesia are employed, involving the use of complicated apparatus, or when deep regional injections are attempted which depend for success and safety upon special preliminary grounding in details of neuroanatomy and physiology.

Dr. Bortone and his committee, then, in a study of the work done in twenty-two institutions and in a review of 50,000 anesthetics brand as avoidable fatalities and as the result of professional apathy and neglect, deaths which may be directly attributed to the unrestrained activities of inadequately trained anesthetists!!

Erroneous Impressions

IN THE FACE of conclusions of such weight and significance emphasis upon lesser points in the survey may seem both irrelevant and detracting. Unfortunately, however, to make a critical review of this survey, as is my assignment, carries the necessity of bringing to note certain apparent flaws and points which might

create erroneous impressions. This report has something of an official cast, representing as it does an investigation sponsored by the American Society of Regional Anesthesia and purporting to be a survey of anesthetic conditions in the State of New Jersey. We are under obligation to guard against allowing unwarranted impressions to creep in unnoticed.

With these negative phases and criticisms I shall be brief. And I have, it is hoped, made sufficiently clear my respect for the major work and recommendations of this committee to necessitate no word of apology for other notations it seems important to add. My object is to indicate discrepancies rather than to give them stress.

First, a word is required as to the permissibility of expressing conclusions in terms of percentages: When we speak of the percentage mortality of the trained anesthetist group, the 35% greater general mortality of the nurse-anesthetist group and the 253% greater mortality of the untrained interne anesthetist group, this use of percentage as the basis for comparisons is fair and legitimate since each group has dealt with many thousands of cases. But when we are speaking, not in terms of thousands or of hundreds, but of units, it becomes unfair to put conclusions on such a percentage basis; here we should express conclusions in specific numerals or units only.

To illustrate: This committee finds that 66 2/3% of institutions which furnish instruction in anesthesia and anesthetic methods are those classed as *unapproved* by the American College of Surgeons; while only 47% of those classified as *approved institutions* offer such instruction. The committee asks: "Is this not a small percentage of approved hospitals wherein instruction of this kind is offered?" The obvious answer, and one with which we heartily agree is, "Yes, far too small." Yet this comparison of *approved* and *unapproved* institutions is an unfair one in view of the fact that only three private institutions answered the questionnaires. This means that the impressive figure published in the report "66 2/3% of unapproved institutions" (implying a study of conditions throughout the State of New Jersey) actually means but two private hospitals (the third offering inadequate data). And the re-

sults of work in these two institutions are compared on a percentage basis with results in twenty hospitals on the approved list. Such a comparison is obviously unjustified. It might be preferable to state: "About half, or specifically nine of the twenty approved institutions included in this survey, offered instruction in anesthesia"; and to add: "of the three private institutions which answered the questionnaire, two offered such courses". The American College of Surgeons does too impressive, broad, and productive work for surgical betterment to warrant any implication such as this published in our report!

It would be possible, placing upon a percentage basis all figures in the report, to draw certain almost ludicrous conclusions. Thus it might be made to appear that the interne anesthetist, against whom such serious criticisms have been leveled and who has an inexcusably higher death rate from the administration of inhalation narcotics than has the physician anesthetist or even the nurse anesthetist, may give all forms of regional and local anesthetics with impunity. For the figures show that this group (interne anesthetists) has given spinal anesthesia, paravertebral blocks, sacral blocks, and local blocks without a single resulting death. The flaw in this line of reasoning is that although the interne group gave thousands of the general anesthetics here reported, yet they gave but 6% of the regional anesthetics, *i.e.*, from all institutions they gave but four sacral blocks, thirty-five conductive trunk blocks, and so forth. Here again is an instance, therefore, in which figures and comparisons when computed on a percentage basis would lead to erroneous impressions, due to the lack of adequate and justly comparable figures.

Again, on this same basis of criticism, the published results concerning the comparative safety of certain drugs and methods must also be taken "cum granum salis." Among all groups (trained anesthetists, nurse anesthetists, surgeon anesthetists, and interne anesthetists) but thirty-two rectal anesthetics were reported. How can the percentage safety of this method be fairly compared, let us say, with that of ether which was administered over 29,000 times? The merest trifle, either

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of luck or of misfortune, in the method used but thirty times, must effect the percentage result beyond all reason. Longer and larger studies are needed for final conclusions on this point; and comparisons may be made only when numbers and conditions make comparisons just.

The published implication that neocain is the most unsafe local anesthetic agent falls within this same category of seemingly (to me at least) unwarranted assertions. This is particularly true since the dosages employed in some institutions surveyed ran as high as 240 milligrams for spinal injections, even for very high injections. Our honorary president, Dr. Gaston Labat, advocates maximal spinal doses of but 120 milligrams and himself somewhat dreads, I believe, high spinal injections, particularly when of high concentrations of the drugs. Certainly he does not now advocate such levels for subarachnoid block as the upper dorsal and cervical regions except under the most unusual of circumstances, if at all. May a drug be condemned or maligned upon the basis of records of its improper use? No more than might ether be condemned upon the basis of results from its administration in doses of from six to eight cans at one time.

A word of caution might here be added concerning the dangers from a too ready acceptance for general trial and use of new drugs and anesthetic agents which continually spring up under the sponsorship of commercial houses. How often do such drugs make their appearance, how enthusiastically are their supposed advantages noised about, yet how frequently does a chain of fatalities follow their use—fatalities but slowly reported, until finally a wave of certain resultant deaths sweep the dangerous product from the market. New drugs and advances are ever welcome; but should our personal employment of them not await a verification of their merits by a dependable research hospital rather than to rest upon the claims of those commercially interested or of enthusiasts directly connected with their acceptance and adoption?

My final criticism of the published conclusions in this survey has to do with the assertion that all regional and local methods combined are 52% more dangerous to life than are inhalation

methods, considered collectively. This brings to notice the greatest shortcoming of the investigation, namely, the study of these deaths without reference to the types of operations performed and the preoperative conditions of these patients, *i.e.*, without direct reference to risk. In many institutions spinal anesthesia is still reserved for solely the bad risk case. The recency of the revival to widespread use of spinal anesthesia ensures certain irregularities as to the manner of its routine employment. In these twenty-two institutions studied upon the basis of their 1930 records, 4,800 spinal injections were made during the year; who can believe that in these same institutions there were as many as four *Hundred* such injections five years earlier.

Time, controlled figures, and full definitions of terms, such as the drugs used, exact dosages, types of operations, and estimated preoperative risks, and so forth, must be available before final conclusions may be reached. In inadequately trained hands spinal anesthesia is, we feel certain, a method fraught with danger; but we likewise believe upon the basis of many papers previously submitted to our society that in adequate hands and under controlled circumstances the safety of spinal anesthesia is fully equal to that of many forms of inhalation narcosis. The report shows that in the hands of trained surgeon or regional anesthetists, the spinal death rate was approximately three cases per thousand, while that from avertin, for example, was four in a thousand. And I believe that to publish as a true finding or fact under the survey of the American Society of Regional Anesthesia the statement that regional and local methods are 50% more dangerous to life than are other methods is a very wrong thing to do. This statement is no more defensible on careful study of the survey than are several which I have just brought to attention. Were this sweeping generalization actually true this Society would welcome it in order to seize upon the opportunity clearly to define the circumstances making for greatest safety. But there can only be regret that this excellent report contains a statement so basically indefensible.

A point in the report which merits our special attention is that pertaining to the advisability of a more wide-

spread use of purely local and field-block methods. For among all types of anesthetists (internes, specialists, and surgeon anesthetists) not a single death resulted from peripheral nerve blocking in over 7,000 instances, of its use. Our determination to attain greater perfection in such methods in which only a limited portion of the body is rendered analgesic, and our ambition to advocate more widespread use of local and field-blocks should immediately be made.

Conclusions

IN CONCLUSION, let us express our appreciation to this committee for this important study and to testify to an understanding of the large amount of effort and persistence required in the collection of these data.

The problem of lowering anesthetic death rates is for the anesthetists to solve. But the solution they cannot satisfactorily reach without help from the surgeons. It should be determined that every aid be given in the creation, in all hospitals, of adequate departments of anesthesia; that vigorous efforts be made to see that these be headed wherever practical by trained physician anesthetists; and that rights and authorities compatible with their importance in surgical work, be granted to these specialists. The figures of this survey clearly demonstrate to the surgeon that his own best interests, as well as those of his patients, lie in this direction. Complete cooperation should be guaranteed to these colleagues, the trained physician anesthetists, who, by their wise selection of drugs and methods—work with us to the common end of saving the lives of those who submit to operation.

31 PARK AVENUE.

Discussion

DR. FRANK BORTONE: The criticism presented by Dr. Livingston is just, that it is unfair to compare the percentages of forty cases or ten or twelve cases with thousands of cases. It is also true that a wrong impression would be created, that spinal anesthesia is a safe anesthesia in the internes hands, for he has no mortality, while the attending and surgeon anesthetists have. However, there are many factors that should be considered. Probably the interne

did not get the cases that were really serious, but only ordinary cases to which he administered spinal anesthesia, while the attending anesthetist, no doubt, got the more hazardous cases and poor risks.

Statistics cannot be compared without a study of the tables, that is why I included them in this paper, so that in glancing over them the correct impression would be given, and it could be readily seen that there are relatively few cases of avertin, sodium amytal, and so forth, with no deaths. It naturally would be unfair to compare this small number with thousands of cases where there are no deaths.

There is another wrong impression that went forth and that is my fault; that is the question that neocain spinal has the highest mortality. This is not true, to blame the drug neocain, itself. Under the caption neocain, novocain is included, and there are more spinal novocains than spinal neocains, with no difference in mortality. The two are combined, using them synonymously. The impression that neocain is the chief cause of death under spinal is absolutely wrong. It is the spinal anesthesia itself which is hazardous.

That which has been most strongly suggested to me in this report is the fact that this Society should go on record, either Doctor Allen or Doctor Reich has recommended, as advocating the preparation of a definite chart for the tabulation of Regional Anesthesia as administered, so that complete records can be obtained at any time. It is a fact that in most institutions today these records are kept very inaccurately. Usually only the dosage of the drug is recorded. The height of the anesthesia is not indicated, neither is any reference made to details such as the use of ephedrin and preoperative drugs, time of administration, blood pressure, pulse during administration, site of injection, method used, as to barbotage, amount of spinal fluid withdrawn, the preoperative condition of patient, and so on.

I blame a good many of these deaths upon the anesthetist himself. I feel that anesthetists are responsible in this respect. There should be a Department of Anesthesia, and there should be not only one anesthetist in an institution, but an anesthetist in charge, with an as-

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sisting staff. In hospitals there are ordinarily five or six surgeons and but one anesthetist. Very often the anesthetist cannot be obtained at the hour he is needed. Therefore, the interne is resorted to or the regional anesthesia administered by the surgeon himself. In emergencies occurring during the night the anesthetist cannot always be located. Therefore, the interne is used on poor risks, which in itself is a detriment.

Better results could no doubt be obtained if the anesthetist would organize his department and have two or three assistants, so that when he is either not available, or when there are two or three rooms running at one time, his assistants may be employed. Perhaps the failure to organize such a Department of Anesthesia up to this time may be attributed to the selfishness of those anesthetists who desire to monopolize all this type of work. I believe that if the anesthetist would have two or three trained assistants, the nurse anesthetist would be eliminated more or less. However, the specially trained nurse anesthetist is a good anesthetist.

In summing up, the anesthetist should organize his department. Furthermore, he should have the say as to the type of anesthesia to be used and the surgeon should not have to dictate to him in this respect. I am sure that this would be the case if anesthetists were more competent. Anesthetists should demand their rights in institutions and should not be dominated by the surgeons and treated merely as technicians.

Under spinal anesthesia the death rate is high. It should not be. I would not want to give up spinal anesthesia. I use it frequently, but it should be used with discretion. What I mean by that is this. A man who makes use of spinal anesthesia as a routine in every case, without any discrimination, has a high death rate, and as a result condemns spinal anesthesia. Spinal anesthesia is often used foolishly. In cases of shock, moribund, coming right from the street, spinal anesthesia should not be used. However, if the anesthetist does employ it, the death should be attributed to the poor judgment of the anesthetist in selecting spinal anesthesia, and not blamed upon

the spinal anesthesia itself. Neither can spinal anesthesia be administered in a case of hemorrhage with shock. Neither would it be wise to take cases such as carcinoma of the esophagus, or stomach with malnutrition and dehydration, and use spinal. A gastrostomy or any other procedure can be done under regional infiltration or nerve and field block, but on the other hand, if spinal anesthesia were employed for such cases a high death rate would probably result.

If spinal anesthesia were used with discretion, mortality would be lowered. There are a few cases of spinal over which there is no control. In moribund cases, spinal anesthesia should not be used. In cases of auricular fibrillation I use straight open ether, or field and nerve block. Some men have the idea that spinal anesthesia is to be used only on poor risks. The most important thing to be remembered with regard to the use of spinal anesthesia, and one of the reasons I would never want to relinquish it, is that it really lowers the operative mortality. It is an intangible thing. It makes a difficult operation easier and quicker. Under its use, tissues need not be mauled or packs used. There is a beautiful relaxation under which to work. Spinal anesthesia, so employed, lowers the operative mortality. It is hard to measure, but it is so. That is my clinical impression.

As I have said, spinal anesthesia, used properly, should not have the mortality this report indicates. I don't believe the statistics for this state are different than those in any other state. If groups of individual statistics, compiled by men who are interested in spinal anesthesia and competent anesthetists, were to be considered, I believe that the mortality would be found to be lower. Nevertheless, should they be studied as a group, good, bad, and indifferent, statistics similar to those presented here would be noted, I believe, in any state selected at random. Individual statistics would show a lower mortality. If Regional Anesthesia were to be more frequently administered, that is, field and nerve block, the resultant mortality would be lower.