Modes of Treatment.

The chief modes of operative treatment which have been employed for cancer complicating pregnancy are by high amputation, vaginal hysterectomy, extended vaginal hysterectomy, abdominal hysterectomy, extended abdominal hysterectomy, and combined abdominal and vaginal hysterectomy.

In the course of the last ten years, great advance has been made in the treatment of cancer of the cervix by radium, mesothorium, and x rays, and for the last five years in several of the chief clinics of Europe operation has been almost entirely abandoned in favour of radiation treatment. It would seem to entail some risk to the fetus, and I am not aware that it has been employed during the course of pregnancy.

The patients are on the average younger, and therefore presumably stronger than non-pregnant patients, but the disease is apt to be more malignant in the young. The glands are, however, comparatively rarely affected (Wertheim).

Treatment during "Early Pregnancy."

(a) "Operable" cases should be operated on at once. The opinion once held that cancer complicating pregnancy was inevitably fatal can no longer be maintained. The best results have been obtained by the extended abdominal hysterectomy, Wertheim's results having been unequalled by any other method. In view of the fact that the glands are rarely affected, vaginal hysterectomy (preferably performed with the cautery) may be employed in feeble or fat patients, as it has a much lower mortality than the abdominal operation, and amputation of the cervix may be performed in early cases of squamous carcinoma, in which there is a desire to preserve the life of the child and the fertility of the mother. During labour or abortion the same operations may be performed if the case is not infected; if infected, the whole womb should be removed.

(b) "Inoperable" cases. If the case is not accompanied by bleeding or infection, the patient should be kept at rest and Porro's operation with the *serre-neud* be performed when the pregnancy is "advanced." During labour or abortion the case should be treated on general principles, with a view of preventing infection, and subsequently treated during the puerperium with the cautery, radium, and x rays.

Treatment during "Late Pregnancy."

(a) "Operable" cases should be treated by Caesarean section, followed by extended abdominal hysterectomy. If the patient is in fair condition, the operation is indicated equally on the ground of science and humanity.

If the patient is feeble or the growth infected, it might be preferable to remove the cervix by the cautery, and then remove the child by the vagina or by the abdomen, and apply radium after, or without, the removal of the uterus. This procedure would probably be safer to the mother than the performance of abdominal Caesarean section and the removal of the uterus (or the cervix after amputation) by the vagina, but would involve some increased risk to the child. Vaginal Caesarean section entails too great a risk of implantation of cancer cells, and no case is recorded in which it has been followed by cure.

During labour the risk to the patient is greatly increased. In the early stages of labour Caesarean section, followed by the extended abdominal hysterectomy, will usually be the best treatment. But if the labour be advanced and the growth not extensive, it may be safer to deliver the patient *per vias naturales*, and afterwards, at an early period of the puerperium, to treat the disease by one of the methods mentioned. It is noteworthy that five of the seven advanced cases "cured" were operated on after delivery.

(b) "Inoperable" cases should be treated by Porro's operation with the use of the *serre-neud*. It has the advantage over the conservative Caesarean section that it removes the placental site from the risk of infection, and over Caesarean hysterectomy with intraperitoneal stump that, in case of infection, discharges will readily escape by the side of the wire, which can be placed on any height above the growth, provided the placental site be removed. In the case of a dead or putrid child it would be possible by the Porro method to close the peritoneal wound above

and around the uterus before the body of the organ was opened or amputated.

During the puerperium the treatment does not differ essentially from the treatment of cases of cancer in the unimpregnated.

At the present time there is a great tendency abroad to treat these cases with radium, mesothorium, and x rays, a reaction having set in against the extended abdominal hysterectomy on account of its high rate of mortality. The late Dr. Pozzi¹⁰ proposed a restricted vaginal hysterectomy completed by radium therapy in cases of cancer of the uterus. Although such an operation is unsuitable for some cases of cancer during pregnancy, I believe that in the puerperium vaginal hysterectomy, or high amputation, performed with the cautery and completed by the application of radium and x rays, will be found to give better results than the extensive operations now usually practised.

The three cases of high amputation described in this lecture which have remained free from recurrence for twenty-five, twenty-two, and nineteen years, are instances of the possibility of cure by simple operations, which are free from danger. As far as I know only two other cases of cancer complicating labour in advanced pregnancy are recorded which have remained well for five years: after operation—namely, Olshausen's (five and three-quarter years), and Von Ott's (eight and a half years) both operated on by vaginal hysterectomy in the puerperium. Two additional cases have been cured—namely, Micholitz's (five years) and Aulhorn's (five years), both operated on by the extended abdominal hysterectomy. The former was in advanced pregnancy but not in labour; no information as to the presence of labour was given in Aulhorn's case. I attribute the result in my cases to the use of the cautery (in two of the cases) and of antiseptic douches, and also to the fact that the operation was performed after delivery when the tissues were involuting.

The rarity of cure of cancer complicating labour in advanced pregnancy seems to justify the republication of these cases with a later after-history.

Sarwey, in Veit's *Handbuch der Gynäkologie*, while mentioning the title of my former paper in the bibliography, does not allude to the cases in the text. Perhaps the after-history of Case 5 may lead the next German writer on the subject to consider the cases worthy of mention.

REFERENCES.

- ¹ *Beiträge für Geb. und Gyn.*, Leipzig, 1902. ² *Archiv für Gyn.*, vol. xii, p. 242. ³ Veit's *Handbuch der Gyn.*, vol. II, p. 850 (1908). ⁴ *Archiv für Gyn.*, vol. xii, p. 242. ⁵ Die erweiterte abdominale Operation bei Carcinoma Colli Uteri, 1911, p. 196. ⁶ *Inaug. Diss.*, Zürich, 1907. ⁷ *Archiv für Ost. u. Gynecol.*, April, 1906, p. 172. ⁸ *Loc. cit.* ⁹ *Archiv für Ost. u. Gynecol.*, 1898, p. 670, and 1900, p. 257. ¹⁰ *Revue de Gynecologie*, vol. xxiii, p. 209 (1915).

THE THERAPEUTIC VALUE OF OXYGEN
IN PULMONARY LESIONS.

PRELIMINARY NOTE.

BY

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It has been demonstrated by Stadie¹ that in cases of pneumonia with cyanosis there may be a considerable deficiency in the oxygen content of the arterial blood. He determined this by examining blood taken from the radial artery, using the technique of Van Slyke.² Using due precautions during collection against exposure to air, he estimated in one sample of the blood the oxygen content and in another sample the total oxygen capacity of the blood; then by comparison of the two results he determined the degree to which the arterial blood was unsaturated with oxygen.³ In normal persons he found this to average 5 per cent. His results showed that there was a close relation between the degree of unsaturation of the blood with oxygen and the degree of cyanosis; while in addition there was a direct relation between the intensity of the cyanosis and the condition of the patient. In other words, the greater the degree of oxygen unsaturation of the arterial blood the more critical was the patient's condition.

The value of oxygen administration in pneumonia has been a subject of much controversy, and the present

Table showing Effect of Oxygen Inhalation on Oxygen Content of Arterial Blood.

Case No. and Disease.	Date.	Cyanosis.	Respirations.	Oxygen given per Minute.	Haemoglobin, Per Cent.	C.cm. Oxygen at 760 mm. Hg and 0° C. taken up by 100 c.cm. of Blood.	C.cm. Oxygen Capacity at 760 mm. Hg and 0° C. of 100 c.cm. of Blood.	Percentage of Oxygen Unsaturation.	Percentage of Oxygen Saturation.
I. Pneumonia.	1920 January 23	Slight	42	None	80	2.24	14.73	15.1	84.9
	" 26	++	44	None		2.62	14.64	17.9	82.1
	" 26	0	44	2 litres for 4 hrs.		1.33	14.64	9.08	90.92
	" 27	0	42	1 litre for 18 hrs.		1.32	14.67	9.0	91.0
	" 28	+	42	None for 4 hrs.		2.33	14.77	15.5	84.5
	" 29	0	36	3 litres for 24 hrs.		0.44	14.76	3.05	96.95
II. Pneumonia.	February 11	Slight	48	None	98	1.94	18.23	10.6	89.4
	" 12	-	36	2 litres for 20 hrs.		0.341	18.40	1.85	98.15
III. Acute and chronic bronchitis.	February 10	+	38	None	97	2.08	18.16	11.4	88.6
	" 11	-	34	2 litres for 4 hrs.		0.55	18.27	3.01	96.99
IV. Normal.	February 13	-	16	None	104	0.852	19.40	4.4	95.6
	" 13	-	15	2 litres for 100 minutes		0.37	19.7	1.87	98.13

investigations were undertaken to determine whether oxygen adequately administered would increase the oxygen saturation of the arterial blood in this condition.

Effect of Oxygen Inhalation in Lobar Pneumonia and in Bronchitis.

The following cases illustrate the results which may be obtained when oxygen is administered in an efficient manner. The method of administration was that devised by Haldane.⁸ No difficulty was experienced by the patients provided the apparatus was in efficient working order:

Dr. Haldane's apparatus, reproduced from his paper in the BRITISH MEDICAL JOURNAL, July 19th, 1919. The gauge shows the amount of oxygen in the cylinder. The reducing valve reduces the pressure to a small amount, which remains constant till the cylinder is empty. The regulating tap shows the flow of oxygen in litres per minute. The tube is of thick-walled rubber. The face-piece is provided with elastic straps and a rubber pneumatic cushion which can be removed for disinfection. The collecting bag, of flexible rubber, is small, and is connected with the face-piece through a mica valve which prevents expired air from entering it. The face-piece has a rubber flap to cause a very slight resistance. During expiration the oxygen collects in the bag and is sucked into the face-piece at the beginning of inspiration. From the movements of the bag it can be seen at any moment whether the patient is receiving the oxygen. The apparatus is put into action by opening the main valve freely and adjusting the tap to give two litres a minute, or whatever greater or less amount may be desired. With a delivery of two litres a minute a 40-foot cylinder lasts nearly ten hours.

The blood of the patients so treated was obtained by the procedure described by Hürter.⁴ The method for estimating the oxygen content and the oxygen capacity of the arterial blood used in the present observations will be described in a future communication. The main principle of the method was to determine the amount of oxygen which a known quantity of arterial blood would take up,

taking proper precautions to avoid exposure to air before the estimation was made. Then the total oxygen capacity of the same sample of blood was determined by the ferricyanide method, and the ratio between the two gave the percentage of saturation or unsaturation with oxygen of the arterial blood.

EXAMPLE OF METHOD.

Amount of blood taken: 2.025 c.cm. Haemoglobin = 103 %.
Amount of gas absorbed, 0.039 c.cm. Bar. 29.76 in. of mercury; temperature 10° C.
Amount of gas absorbed, 0.03697 c.cm. at 760 mm. Hg and 0° C.
Amount of gas physically dissolved, 0.0186 c.cm.
∴ Amount of oxygen taken up by haemoglobin of 100 c.cm. of blood = 0.907 c.cm.
Total oxygen capacity of 2.025 c.cm. of blood = 0.410 c.cm.
Total oxygen capacity of 2.025 c.cm. of blood reduced to 760 mm. Hg and 0° C. = 0.38704 c.cm.
∴ Total oxygen capacity of 100 c.cm. of blood reduced to 760 mm. Hg and 0° C. = 19.11 c.cm.
∴ Unsaturation of arterial blood with oxygen = 4.8 %.
∴ Saturation of arterial blood with oxygen = 95.2 %.

CASE I.—Lobar Pneumonia.

The patient came under observation on the fifth day of the disease. He was suffering from lobar pneumonia, which involved the whole left lung except for a small portion of the apex of the upper lobe. The respirations were 42; there was no orthopnoea, but slight cyanosis. The degree of oxygen unsaturation of the blood from the radial artery was 15 per cent. of the total oxygen capacity.

On the eighth day of disease the cyanosis was more evident, and the arterial blood was 17.9 per cent. unsaturated with oxygen. At 3 p.m. of this day oxygen was first given to the patient by the Haldane apparatus. It was set to deliver 2.5 litres of oxygen a minute. At 5 p.m. another sample of arterial blood was examined and was found to be only 9.08 per cent. unsaturated with oxygen. During the night the oxygen administration was continued at 2 litres of oxygen per minute, and on the ninth day of disease the oxygen unsaturation of the arterial blood was 9.0 per cent. The oxygen was continued till 11 a.m. on the tenth day of disease, when it was stopped. Blood was drawn from the radial artery at 3 p.m., and it was found to be 15.5 per cent. unsaturated with oxygen. Cyanosis was present at this time. Oxygen amounting to 3 litres a minute was now administered and continued until next day, when it was found that the cyanosis had disappeared and that the arterial blood was only 3.05 per cent. unsaturated with oxygen. During the next night the patient had the crisis.

It is evident from this case that the degree of cyanosis and arterial blood unsaturation with oxygen may be readily regulated by the administration of oxygen in sufficient quantities by the Haldane apparatus.

CASE II.—Lobar Pneumonia.

This patient had pneumonia, which involved the left lower lobe and part of the right lower lobe. There was slight cyanosis, and the arterial blood unsaturation with oxygen was 10.6 per cent. This was on the sixth day of the disease. The patient was given oxygen, amounting to 2 litres a minute, until the next day, when all signs of cyanosis had disappeared, and the arterial blood was found to have an oxygen unsaturation

amounting only to 1.85 per cent. The oxygen was continued, and the next day the patient had the crisis.

CASE III.—*Acute Exacerbation of Chronic Bronchitis.*

This patient was suffering from an acute exacerbation of a chronic bronchitis associated with moderate cardiac failure. There was slight orthopnoea and cyanosis, with an irregular distribution. The hands and ears were purplish in hue, while the lips were only slightly so. The arterial blood was unsaturated with oxygen to 10.9 per cent. Two litres of oxygen a minute were administered by the Haldane apparatus during the next twelve hours, when the cyanosis had completely disappeared, and the orthopnoea was practically gone. The arterial blood at this time was unsaturated with oxygen to 3.01 per cent.

EFFECT OF OXYGEN INHALATION IN HEALTH.

The degree of unsaturation with oxygen of the arterial blood of five normal cases was determined. It was found to average 5.1 per cent., ranging from 4.4 per cent. to 5.6 per cent. It will be noticed that in the pathological cases outlined above the arterial blood oxygen unsaturation showed an appreciable decrease from normal when a sufficient oxygen concentration of the inspired air was administered. Therefore it was considered of importance to determine whether the administration of oxygen would reduce the oxygen unsaturation of the arterial blood of a normal person. Arterial blood of a normal adult was examined and the oxygen unsaturation was found to be 4.4 per cent. Two litres of oxygen a minute were administered by the Haldane apparatus for 100 minutes and the arterial blood again tested for the arterial oxygen unsaturation, which was then found to be only 1.87 per cent. This confirmed the previous observations in the abnormal cases that the inhalation of inspired air sufficiently enriched with oxygen may diminish the oxygen unsaturation of arterial blood beyond the normal limits.

CONCLUSIONS.

1. In certain respiratory diseases where there is anoxaemia of the arterial blood the efficient administration of oxygen will diminish this anoxaemia and so relieve the cyanosis.
2. If the oxygen be given in sufficient concentration in the inspired air the arterial saturation with oxygen may be raised above normal.
3. This result may be obtained both in normal individuals and also in certain of those suffering from certain respiratory diseases.

REFERENCES.

- ¹ Stadie, *Journ. of Exper. Med.*, vol. xxx, No. 3, 215, 1919. ² D. D. Van Slyke, *Journ. Biol. Chem.*, 1918, xxxiii, 147. ³ Haldane, *BRITISH MEDICAL JOURNAL*, July 19th, 1919. ⁴ Hürter, *Deutsch Arch. Klin. Med.*, 1912, cviii, 1. ⁵ C. Lundsgaard, *Journ. Biol. Chem.*, 1918, xxxiii, 133; *Journ. Exper. Med.*, 1918, xxvii, 179, 219.

CUTANEOUS MANIFESTATIONS IN A CASE OF CERVICAL FISTULA.

BY

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THE following case raises some points of general importance:

In September, 1919, Nurse M., aged 30, consulted me for loss of hair, and complained of being "run down." I found falling of the hair of the scalp and eyebrows and some loss of eyelashes. The skin generally was dry and rather scaly; the cheeks were not flushed, but the complexion was muddy and the face wanting in expression; the voice was normal. The front and sides of the neck, as well as a V-shaped exposed portion of skin over the sternum, were very red, suggesting at first sight sunburn, but on closer inspection the redness was seen to be due to dilated venules without heat, swelling, oedema, or pigmentation. On the right side above the head of the clavicle was a very white patch 2 in. in diameter and nearly circular; it resembled leucoderma, but there was no trace of excessive pigmentation at its margin as occurs in true leucoderma.

Below and internal to the centre of this white area was a round puckered patch of thin skin about 1.5 cm. in diameter, situated about 1.5 cm. above the head of the right clavicle and nearly 3 cm. from the middle line of the neck. On deglutition, this bit of overstretched skin was drawn in and formed a tubular dimple, half an inch deep. Several medical men had, the patient stated, seen it and been unable to explain it. Passing upwards, backwards, and inwards, I felt a firm round

band apparently as large as a No. 2 gum-elastic catheter. She said she was liable to occasional regurgitation of matter into her mouth "like the discharge from a gumboil." The diagnosis was obvious—a pouch at the upper end of a cervical (branchial) fistula. She stated that her father told her that her "grand-mother had something like it." I prescribed a lotion for the scalp, and internally iron and one grain of thyroid extract at bedtime.

When seen on November 17th she looked and said she felt much better, had found benefit quickly from the treatment and release from nursing a mental case. Her complexion was clear, colour good, and the hair had much improved. The redness of the neck had nearly gone, and there was now no contrast between white and red. The overstretched (often so-called atrophic) skin had become red, as if recovering normal nutrition. The round, firm, rod-like band was thinner and more distinctly fibrous. The dimpling on deglutition was not so marked, only a quarter of an inch.

A few years previously the patient had the appendix removed and after the operation was told that she had better never take another anaesthetic, as she had then taken it badly. Seven years ago she had "faintings and a suspicion of hyperthyroidism and mitral disease." She believes the cervical fistula discharged, until the age of ten years, through a little lump the size of half a pea. Sometimes, if she leans forward on a stiff collar, "a discharge is felt coming from the throat into the mouth." I think the right thyroid was more prominent than it was in September (two months earlier).

I do not think I ever met with such a change in nutrition before and in such a short time; the oddest point to me being the change found in the round ligamentous band and its attachment to the skin. Is Nature trying to absorb the band or reopen it as a sinus? It is so obvious that the patient, whose physique is otherwise good, is having her health ruined by the filthy pouch that I have passed her on to a surgeon's care.

The red area of skin on the sides and front of the neck, already referred to, was too peculiarly localized and delimited to be attributable solely to exposure to light and weather. It corresponds to the area of referred "choking pain" described by Head in connexion with the passage of an oesophageal bougie.¹ It is also a blushing area, as is well shown in some young women. That vasomotor pathological changes should take place there is not so surprising when we consider that it is probably at the "seaming-up of the segments" that such affections as linear naevi, ichthyosis hystrix, linear papillomata, and even occasionally lichen planus (in lines) occur. In one very rare case I have seen a line of lichen planus reached from the hip to the foot. No one nerve or blood vessel will account for such changes of distribution, but "the seaming-up of segments" and the closing of clefts during fetal life give a clue. During last year I called attention to a rare form of tuberculide, and suggested for it the clinically descriptive term "lichenoid." It closely imitates lichen planus and tends to develop in lines.

REFERENCE.

- ¹ *Brain*, 1893, vol. xvi, p. 1, and Fig. 12, p. 364.

Mentoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

SUBCUTANEOUS RUPTURE OF THE SUBCLAVIAN ARTERY.

ON January 16th, 1918, a heavy, muscular man, aged 48, weir keeper at one of the up-river locks, was hurriedly pulling up one of the sluices during rising water when he suddenly felt a severe pain in the right arm and at once experienced considerable loss of power. There was no mark of injury and no swelling to be detected, but the whole hand and forearm felt cold, numb, and weak, and he had to stop work at once. Five weeks after the injury I found that the right arm was quite cold and pale. There was no muscular wasting, and all ordinary movements could be carried out with precision. No pulse at all could be detected anywhere in the arm from the axilla downwards, but the subclavian pulse was readily felt and appeared to be equal to that on the other side. No aneurysmal or other swelling could be detected, and, in fact, beyond the absence of pulse and the pallor and chilliness of the arm, nothing abnormal was to be found. There was no evidence of any cardio-vascular disease.