

THE FREQUENCY AND DANGERS OF FIBROIDS OF THE UTERUS.

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So much has been written in recent years concerning the dangers and treatment of fibroids of the uterus that at first sight it would seem almost necessary to offer an apology for presenting anything further upon the subject, but the very number of the papers which have appeared is, in itself, excellent proof that the question has not yet been satisfactorily settled. Since anything which will in any way add to the common store of knowledge upon this subject must be acceptable, and since deductions become of progressively greater value as the number of cases from which they are drawn increases, it has seemed worth while to add the experience at the Boston City Hospital to the statistics already published.

In the first place, fibroids are the commonest tumors of the uterus. Up to Jan. 1, 1910, there were admitted to the Gynecological Service of the Boston City Hospital, during a period of fifteen years, the following uterine tumors:

Myoma,	316 cases
Cancer of the cervix,	268 "
Cancer of the corpus,	24 "
Sarcoma,	4 "
Malignant leiomyoma,	1 case
Chorio-epithelioma,	1 "
Lymphendothelioma,	1 "

The actual predominance of fibroids is much greater, however, than is represented above, for these figures include only those cases in which symptoms or the size of the tumor compelled the patient to seek relief.

Comparatively few accurate figures relative to the actual frequency of fibromyomata are to be found in the literature. According to Bayle,¹ fibroids are present in 20% of all women over thirty-five years of age. Hofmeier² found myomata in 486 out of 11,073 patients admitted to his clinic, and in 147 out of 1,513 private patients, or about 4.3% of the former and 9.7% of the latter. Essen-Möller³ found 532 women suffering from fibroids among 11,203 entering the clinic of Engstrom, and Kleinwachter,⁴ 184 myomata among 4,100 women. In Döderleith's⁵ clinic, between the years 1897 and 1904, out of a total of 5,000 patients, 500, or 10%, entered for the removal of fibroids.

Autopsy statistics obviously give a more accurate idea of the actual frequency of these tumors than figures taken from clinical sources. Essen-Möller,³ v. Winkel⁶ and v. Fewson⁷ give respectively 12.6, 12.7 and 19.7 as the percentages of female bodies in which they found myomata of the uterus. Kelly and Cullen,⁸ in 742 autopsies upon females of over twenty years of

age at the Johns Hopkins Hospital, found uterine fibroids in 148, or 20%. In this series, 311 were performed upon negroes, and of these, fibroids were found in 105, or 33.7%. In 431 autopsies upon white women, myomata of the uterus were found in 43, or only 10%. Champneys,⁹ in 1,860 autopsies upon females of over thirty years performed at St. Bartholomew's Hospital, found fibroids of the uterus in 141, or 7.5%. Ellice McDonald,¹⁰ in 175 autopsies upon women over twenty at the Bender Laboratory, found them in 26, or 14.8%, and of these 26, all but 3 were over thirty-five.

Through the courtesy of Dr. Frank B. Mallory, the writers have gone over the autopsy records of the Boston City Hospital. Excluding the few where death followed an operation for the removal of a fibroid of the uterus, there were 971 autopsies performed upon adult females. Fibroids were found in 159, or 16.3%. Taking only those bodies in which the age was known, there were 587 over thirty-five, and of these fibroids were present in 129, or about 22%. In 363 under thirty-five, myomata were found 26 times, or in about 7.1%.

Thus the great increase in the percentage of fibroids in middle and later life and the somewhat startling frequency of occurrence is very apparent. The tumors varied greatly in size and number, the figures given including single and multiple small fibroids and single and multiple fibroids of larger size, and an attempt at detailed classification would be complicated and confusing. In few instances was there but a single nodule, the rule being two or more, whether of small or large size. In 53, or exactly one third, there was at least one tumor exceeding 2.5 cm. in diameter. The largest single growth was the size of a man's fist. With few exceptions these tumors had been unrecognized during life. In a single instance death was the result of the tumor. This case entered the hospital with symptoms of intestinal obstruction and died soon after admission. Autopsy showed a loop of intestine caught between the tumor and the promontory of the sacrum. The gut was obstructed and showed evidences of peritonitis, but was not gangrenous. Although the vast majority of these fibroids were of comparatively small size and had produced no symptoms, it must be remembered that, presumably, each of them, even to the smallest, possessed the possibility of growth to large size.

Several writers have referred to the frequency with which small fibroids are found in the course of operations upon the pelvic organs, but without giving statistics. We have examined the records of 1,800 celiotomies performed for conditions other than fibroids upon the Gynecological Service of the Boston City Hospital. The abdomen in each case was opened by a median incision and gave perfect facilities for inspecting the condition of the uterus. Of 1,402 patients under thirty-five, small fibroids were found in 32, or 2.3%, and in 399 over thirty-five years of age in 22, or 5.5%.

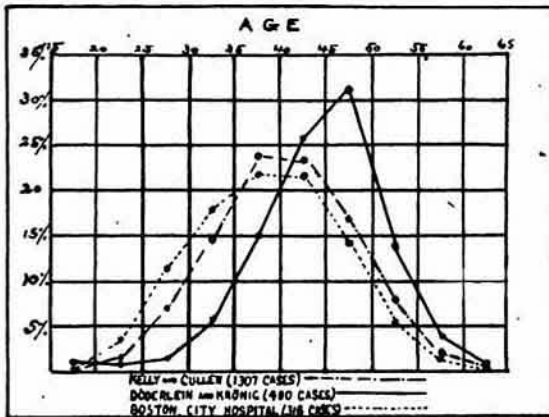
The discrepancy between these figures and those given for autopsies is explained in three ways:

1. The fact that most of our patients over thirty-five entered for the repair of lesions resulting from childbirth. (The relationship between fibroids and sterility will be spoken of later.)

2. Only subperitoneal tumors, or those of some size, could be detected in this way.

3. Where the fibroids had attained considerable size the uterus was removed and, therefore, the case not included in this analysis.

The discrepancy, therefore, which at first sight seems large, becomes no greater than would be expected. In some instances the fibroid was of sufficient size to be recognized before operation, but no case is included in which the abdomen would have been opened solely for the purpose of removing the tumor.



Incidence of Myoma of the Uterus.

It is of some interest and importance to note the age at which myomata most frequently appear and cause trouble. The accompanying chart shows the percentage of patients at different ages operated upon for fibroids in 1,307 cases of Kelly and Cullen,¹¹ 400 of Döderlein and Krönig,¹² and 316 from the Boston City Hospital. The latter figures agree closely with those of Kelly and Cullen in placing the greatest age of incidence between thirty-five and forty-five, and differ from those of Döderlein and Krönig, who found the greatest number of patients coming to operation between forty and forty-five.

The credit for first approaching fibroid tumors from the standpoint of their danger from complications and degenerations belongs to Martin.¹³ His example has been followed by Noble,¹⁴ Cullingworth,¹⁵ Frederick,¹⁶ Scharlieb,¹⁷ Watt-Keen,¹⁸ Hunner,¹⁹ Lauwers,²⁰ McDonald,²¹ Eastman,²² Webster,²³ F. H. Martin,²⁴ Cazenare,²⁵ Giles,²⁶ Sarwey,²⁷ and Jacobs,²⁸ who together have reported a total of 3,561 cases which have been carefully analyzed by Tracy.²⁹ We shall not attempt to recapitulate Tracy's statistics, but, for a detailed and thorough study of the previously reported cases, will refer the reader directly to his article. The material which we have studied consists of 163 fibroids removed by hysterectomy or myomectomy, 16 submucous tumors removed through the vagina, 137 in which only a

curettage was done, and the 159 found at autopsy. In this analysis we shall try to determine the danger of fibroids of small or moderate size, and those of larger size, keeping clearly in mind the distinction between the two classes. The following table presents the frequency of degenerations in the tumor:

Degeneration.	Abdominal cases.	Vaginal cases.	Autopsy cases.
Necrosis,	12	8	1
Hyaline degeneration,	4	0	1
Cystic degeneration,	2	2	1
Calcification,	1	0	15
Edema,	2	1	0
Hemorrhage,	1	1	1
Cases showing more than one form,	1	1	1
Total number showing some form of degeneration,	21	11	18

Of these, hyaline and cystic degeneration, edema and calcification are not essentially dangerous to life and may be dismissed without further mention. Necrosis, on the other hand, furnishes the chief danger of fibroids *per se*. It is most frequent in submucous tumors and resulted in two deaths. The prognosis of necrosis of fibroids in this location is not bad, however, if operation is performed early. Both fatal cases were operated upon only when the necrotic process had been going on for some time and the resulting infection had already become too great to be overcome. Necrosis of interstitial or subserous tumors, if allowed to become extensive, presents one of the gravest of surgical problems. Four of the 12 patients entered the hospital with peritonitis already developed, and all died, although immediately operated upon.

Sarcoma of the uterus was found associated with fibroids once at autopsy and once at operation. In the latter instance it was probably primary, and in the former secondary to a growth in the urethra. This case has been reported in full by Low and Lund.³⁰ McDonald³¹ found sarcoma 7 times in 700 fibroids examined at the Bender Laboratory. Noble¹⁴ found sarcoma present in 2% of the 4,017 fibroids collected by him. Kelly and Cullen³² found in their 1,400 fibroids 17 associated with sarcoma. Sarcoma may develop either from the connective tissue elements or the muscle fibers. Thirteen of Kelly and Cullen's cases were of the latter variety. Aside from the danger of sarcoma as a complication or degeneration of fibroids, the danger of a pure sarcoma being mistaken for a fibroid is very great. In fact, the correct diagnosis is usually made for the first time after the abdomen has been opened, or often in fact by the pathologist after the uterus has been removed. This fact is, in itself, a strong argument for the removal of all fibroids which have attained a considerable size. Dr. Mallory³³ has given the name "malignant leiomyoma" to a type of rapidly growing, clinically malignant tumor composed of smooth muscle cells. This growth could easily be mistaken for a spindle-cell sarcoma arising from connective tissue, and many instances have undoubtedly been so classified.

Carcinoma of the corpus complicating fibroids was the subject of a paper by one of us³⁴ in 1908. Since the publication of that article, 2 more cases have been encountered at the Boston City Hospital, making a total of 4 among 475 fibroids. In an analysis of 8,992 fibroids from the literature, adenocarcinoma of the corpus was found in 1.4%.³⁴

Cancer of the cervix was found by us twice in 475 fibroids. McDonald³¹ found it 6 times in 700, Kelly and Cullen,³⁵ 18 times in 1,400; Noble,¹⁴ 63 times in 4,880 analyzed from the literature. Noble's figures, however, included 999 of Kelly's cases in which 16 cases of cancer of the cervix were found, leaving 2 in the remaining 400. It hardly seems possible that there can be any relationship between the two growths.

Lymphendothelioma as a complication of fibroids was found once, the only instance of this tumor met with in the entire records of the Gynecological Service.

It was possible to examine the endometrium in 285 of the cases on the Gynecological Service and the 159 found at autopsy. Beside the four instances of adenocarcinoma, hyperplasia of the endometrium was found in 22, chronic endometritis in 9, edema in 1 and in the others the endometrium was normal.

The following table shows the condition of the appendages in the 163 patients operated upon by the abdominal route.

Acute inflammation of the appendages,	7
Chronic	25
Normal appendages with "adhesions,"	3
Ovarian cysts (simple),	3
Adenocystoma of ovary,	2
Tubal pregnancy,	1
Chronic appendicitis with adhesion to tumor,	2

Acute salpingitis or salpingo-oöphoritis presumably had no connection with the presence of the tumor. The occurrence of chronic salpingitis in a large percentage of cases, together with the frequency of adhesions of the tumor to other organs, giving evidence of chronic inflammation of the peritoneum, certainly is at least suggestive that the fibroid was a distinct etiological factor. On the other hand, the prevalence of infection with the diplococcus of Neisser is so great among the class from which these patients came that no trustworthy conclusion can be drawn.

Until the etiology of ectopic gestation is more clearly understood it is impossible to say whether the tumor had anything to do with it or not. The single case was complicated by a chronic tube on the opposite side. There seems to be no reason to connect the presence of the uterine with the cystic ovarian tumors. It is notable that there was no case of associated fibroid of ovary and uterus, and Tracy found only 9 such instances ($\frac{1}{4}$ of 1%) in 3,561 uterine fibroids.

Attention was first drawn to cardiovascular disease and degeneration as a result of uterine myomata by Hofmeier,³⁶ and subsequently by numerous others. Leopold,³⁷ on the other hand, and later Kelly and Cullen,³⁸ deny the occurrence of cardiac and vascular changes, claiming that

the enlargement of the heart and the murmurs described are merely the result of anemia. We shall not attempt to discuss this condition because the cases which we have studied with few exceptions were not examined by medical specialists, and the tumors found at autopsy were comparatively small and would not be expected to bear much relationship to cardiovascular disease. Post-operative vascular complications were frequent. Pulmonary embolism occurred 5 times and thrombosis of the femoral vein 9 times, 7 times on the left and twice on the right side.

Of the relation of fibroids to sterility we shall speak only briefly, for it is not, strictly speaking, germane to the subject of this paper. Of the 316 patients admitted for fibroids, 238 were married and 78 single. Of the married patients, 75, or 31.6%, had never been pregnant.

In this consideration of the complications and degenerations of fibroid tumors of the uterus, it will be seen that we have included some that were distinctly dangerous to the patient's life and others which were of no especial importance. In 7 cases death could be directly attributed to the presence of the tumor, six times being the result of necrosis and infection and once of intestinal obstruction. Following Tracy's example, we have grouped in the following table those degenerations and complications which, if allowed to progress, would have resulted fatally, and including the 7 which did so terminate.

	Abdominal cases.	Submucous cases.	Autopsy cases.
Necrosis,	12	7	1
Carcinoma of the corpus,	3	0	1
Lymph endothelioma,	1	0	0
Sarcoma,	1	0	1
Intestinal obstruction,	0	0	1
	17	7	4

It will be seen that the percentage of these complications varied greatly with the size and seat of the tumor. The fibroids found at autopsy were for the most part small, and, complications and degenerations were found to be infrequent. In those operated upon by the abdominal route, the tumors were of greater size and with few exceptions had given rise to symptoms of sufficient importance to demand interference for their relief alone. The high percentage of necrosis in submucous tumors and fibroid polyps would demand their removal even if it were not made necessary by symptoms. Thus it is seen that fibroids fall more or less naturally into three well-defined groups. One of these consists of tumors of considerable or large size and giving rise to the severer symptoms. In this group complications or degenerations which would have led to a fatal result were found in 10.5%. This figure agrees exactly with Tracy's, for 3,561 cases which were apparently all representatives of this group. A second class consists of submucous tumors showing necrosis in 43 $\frac{1}{2}$ % and a mortality of 12 $\frac{1}{2}$ %. The third is made up of the small and symptomless fibroids discovered at autopsy. From this class is excluded one of the autopsy cases, that

in which the patient died from intestinal obstruction,—in which the tumor was of a size reaching three fingers' breadths above the umbilicus, had been discovered before death, and if the patient had not been moribund would undoubtedly have been operated upon. In the case of carcinoma of the corpus, in which the fibroid was not diagnosed before death, and that of sarcoma, which was but a metastasis from a growth elsewhere, the fibroid cannot be considered to have borne any causal relationship to the complication, so that the single instance of necrosis is the only one of the third group in which the tumor itself can be said to have presented any danger to life.

The following conclusions which we have drawn from the study of the material here reported seem to the writers to be well justified, and agree essentially with those which have been drawn in other papers upon this subject.

CONCLUSIONS.

1. Fibroids of the uterus occur in from 7% to 16% of all adult females, and in from 7% to 22% of all over thirty-five years of age.

2. The age at which fibroids giving rise to symptoms which demand their removal are most commonly encountered is shown by American statistics to lie between thirty-five and forty-five, and by German figures between forty and fifty.

3. Fibroids may, in the main, be divided into three groups: (a) Fibroids of considerable size, nearly all of which produce symptoms. (b) Fibroid polyps, and submucous fibroids which project markedly into the uterine cavity. (c) Small and symptomless fibroids.

4. In fibroids of considerable or large size complications and degenerations dangerous to life occur in at least 10.5%, and for this reason alone the routine removal of all such tumors is indicated.

5. In submucous tumors and fibroid polyps necrosis occurs in over 43%, and the excision of all such growths is, therefore, indicated.

6. Small and symptomless fibroids are absolutely innocuous and of such frequent occurrence that they may safely be let alone. Such tumors, however, when met with in the course of operations for other conditions should be removed when feasible, because there is always the possibility that they may increase in size.

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