

Eileos in the Internal Affections of Hippocrates

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CHRONIC KIDNEY FAILURE has many manifestations, and distinguishing among signs and symptoms (1) from the underlying disease, (2) from the diseased kidney, and (3) from the accumulation of waste products normally cleared by the kidneys (uremia) is complex with a vast literature. To equate management of chronic kidney failure by ancient physicians with early twentieth-century therapy therefore may seem presumptuous. And yet study of the history of medicine can reveal the origin of critical thinking that initially fueled medical progress we now enjoy, and technology will have its limits. It is with this in mind that the present translation of chapters 44–46 of the Hippocratic *Internal Affections* is offered for linguistic accuracy and thereby its clinical insight.¹

Internal Affections is less difficult to translate than it is to understand, and perhaps this is the reason it is not often analyzed in detail. The disease descriptions tend to be inadequate, to the modern mind the pathogeneses often seem absurd, and therapies are limited and repetitive. It has been proposed that this

¹ The Greek text is that provided by the readily available Loeb: Paul Potter, *Hippocrates* VI (Cambridge [Mass.] 1988) 67–255 (219–227 for ch. 44–46). I compared Potter’s Greek text with that of the 1538 Froben edition (Basle), ed. Janus Cornarius, and with the modern edition of Émile Littré, *Oeuvres complètes* VII (Paris 1851) 274–280. I find only a handful of insignificant differences in the former. Although the Littré edition expressed more differences, the only clinically relevant change with the Loeb text was Potter’s omission of οὐ in the last sentence of ch. 46 paragraph 1, but which I include in my translation as being more believable.

treatise is the work of a single physician, to which it can be answered that, while such may be the case, to have garnered the clinical expertise to justify speaking authoritatively about such a large number and great variety of seriously ill and presumably longitudinally followed patients the physician must have been on the staff of a large municipal hospital in a major city, of course impossible in the days of Hippocrates.² On the other hand, the repetitiveness, the similarity of the author's ideas on causation, and the similarity in treatments despite obviously dissimilar diseases might have been the work of a single, perhaps idiosyncratic or non-Hippocratic, physician. Overall, therefore, if one's purpose is to seek intellectual insight into the professional minds of Hippocratic physicians, it may be difficult to take the work seriously. This paper, however, is such an attempt, and an alternative translation of the word εἰλεός, commonly rendered as a specific syndrome involving the intestines and colic often termed "ileus," is a component of the evidence.

I. Terminology of εἰλεός diseases

The Hippocratic *Internal Affections* is an early attempt at understanding categories of disease often seen by specialists in Internal Medicine, logical collections of case histories selected by their author as sharing a common nosological identity and thereby an implied etiologic and therapeutic similarity.³ The

² A recent interesting paper on the unusual qualities of *Internal Affections* is P. Perez Cañizares, "Special Features in *Internal Affections*: Comparison to Other Nosological Treatises," *Stud.Anc.Med.* 31 (2005) 363–370; in it the broad experience of the ancient author also is proposed.

³ The nosological treatises of the Hippocratic Corpus, until recently identified as "Cnidian" (see J. Jouanna, *Hippocrates* [Baltimore 1999] 145; first published in 1992), include *Internal Affections*, *Diseases I–IV*, and *Affections*. Hippocratic nosology has been analyzed by Amneris Roselli, "Nosology," in Peter E. Pormann (ed.), *The Cambridge Companion to Hippocrates* (Cambridge 2018) 180–199, who points out that, while the term "nosology" is a relatively recent (18th cent.) development, the usefulness of categorization of diseases was evident to the Hippocratic physicians and that traditional knowledge seemed to be a "constitutive feature of Hippocratic nosology." Also see n.2 above.

category identified by the ancient author for chapters 44–46 as εἰλεός (*eileos*) has been interpreted in Latin and in modern medical writings as “ileus.” The latter is a term that has been quite specific in its applications in that it identifies a blockage or a cessation of peristalsis in a hollow viscus, that being the intestines.

But is that interpretation accurate? εἰλεός, as surmised from dictionary medical descriptions of “coiled” or “twisted” intestines, is usually characterized as having colicky pain. But in the Hippocratic work *Epidemics* 3.9, both εἰλεός (as τὰ εἰλεώδεα) and στρόφοι are used in the same paragraph, the latter clearly meaning colicky pains associated with bowel obstruction, a translation confirmed in many Hippocratic works.⁴ This suggests that εἰλεός is likely to mean something else. Furthermore, in *Internal Affections* 44–46 εἰλεός as intestinal ileus in the traditional sense appears to be incorrect because there is no evidence in any of the patients of bowel obstruction, no abdominal pain or tenderness, and no abdominal distention. It is even specifically stated that food “passes through undigested” (see the first translated paragraph below). Standard Greek-English lexicons are of little help, for “ileus” and intestinal colic have had a firm hold on medical translations of εἰλεός over the centuries.⁵

But perhaps the author meant εἰλεός to designate muscle cramps as well as intestinal colic. Cramps are physiologically distinct from colic, but popular use confuses the two and it can

⁴ This is especially apparent in *De Affect.* 21 and *Morb.* 3.14, for unequivocal bowel obstruction is described under the term εἰλεός, including in the former what probably represented intussusception, most often seen in children.

⁵ So the seventh edition of LSJ (1889), long the lexical gold standard for classical Greek writings; cf. James Donnegan, *A New Greek and English Lexicon* (Philadelphia 1846); M. Wright, *A Greek and English Lexicon* (London 1836); as for persistence into the 20th century I include Potter’s translation of εἰλεός as “ileus” in his Index of Symptoms and Diseases, a list of one hundred Greek terms found in Hippocratic treatises: *Hippocrates* VI 340–343.

be argued that the early Hippocratic physician did likewise. A cramp is pain from involuntary muscle contraction, whether it be striated skeletal muscle or smooth muscle of the bladder or uterus. It is not a sequence of like pains, whereas *σπρόφος* is the recurring colicky pain of abnormal intestinal distention, usually from obstruction. As with colicky pain, however, the present chapters from *Internal Affections* do not describe cramping in patients.

There are other definitions: LSJ⁷ included the following translations of the related verb *εἴλω*: (1) “coop up” and “hold in check,” often with an implication of force; (2) of a hole, cave, or den of a wild animal, suggesting “conceal” or “cover.”

In view of these options and the translations to follow, it is proposed that colic could be justifiably subsumed by *εἰλεός* if the translation reflected the more common uses of *εἴλω* and its derivatives, namely “coop up,” “compress,” “hold in check.” It is argued, therefore, that the reason *εἰλεός* was chosen by the author of *Internal Affections* for this collection of cases was based on their presumed physiology rather than the symptoms they produced. As the following translation will attempt to show, the clinical content of chapters 44–46 is conveniently rendered as “diseases of retention.” This categorization would equate the prominent edema in the present cases, identified herein as due to kidney disease, with the blockage of transit and excretion of intestinal contents in intestinal ileus, the common mechanism of the two being prevention of their normal discharge.⁶

II. Translation of chapters 44–46

There are fifty-four brief chapters in *Internal Affections*, and my translation of chapters 44–46 is given below. Both the location of herbal components as identified by Dioscorides and the

⁶ While *εἰλεός* might seem a possible cognate of Eileithya, the name of the ancient Greek goddess of childbirth who relieves distressed labor that fails to progress, i.e., fails to normally discharge its uterine content, linguistically scholarly opinion supports no such etymologic association: P. Chantraine, *Dictionnaire étymologique de la langue grecque* II (Paris 1970) 318.

scientific names of herbal medicines are also mentioned in the commentary, thus assisting the reader in investigating their medicinal value, past and present.⁷ Finally, the translations are not intended for literary merit but for clinical accuracy, with medical vernacular aiding in specificity.

Chapter 44:

Paragraph 1, clinical status:

These diseases are called “diseases of retention.” They develop primarily from the following: because of the winter when the patient is in need of a high energy and softer diet and yet never takes strenuous walks after completion of meals, instead resting after being satiated, and then, unexpectedly forced to trudge over a long journey, on becoming cold to the bone he thereupon suffers the following. (1) He develops puffiness of the entire body, and (2) his complexion is a dusky gray, and (3) there are continual chills, so that (4) he has thermal hypesthesia. (5) His epidermis comes off easily with hot water and (6) there is dependent edema that is pitting. The legs are heavy, and should he roam about (7) he trembles; and should he walk up a hill (8) he becomes exceedingly dyspneic. And (9) the arms seem to be hanging down, and (10) the head hurts, (11) the eyebrows seem to be hanging down, and (12) he has nightly thirst, and (13) whatever he eats passes through undigested.

Comment: This patient had no fever, which makes an acute infectious disease unlikely, and no injury. The issue indeed seems to be internal. Preceding his illness he was unduly sedentary but for one last journey. It is unknown if he was sedentary because of malaise, fatigability, and weakness that represented an early stage of his present illness. Here is a brief review of the symptoms as numerically cited in the translation, with my

⁷ A recent edition of Dioscorides, *De Materia Medica: Being an Herbal with Many Other Medicinal Materials Written in Greek in the First Century of the Common Era*, edited by T. A. Osbaldeston and R. P. A. Wood (Johannesburg 2000), provides a convenient and well-researched list of Classical era, medieval, and modern scientific names in conjunction with the text of Dioscorides (ca. 40–90 A.D.) as derived from the 17th cent. English translation of John Goodyer.

interpretation italicized:

1. Generalized edema – Orthopnea and dependent edema are common manifestations of congestive heart failure, but this patient has generalized edema (anasarca) without orthopnea at the outset of illness, suggesting *hypoalbuminemia* as a major contributor to his edema. His diet had been nutritious, so protein malnutrition is an unlikely cause of the low albumin. Thus, urinary loss of protein is the likely cause: *nephrotic syndrome*.
2. Dusky gray complexion – Rather than pallor, jaundice, or plethora, and in the absence of cardiopulmonary disease to cause cyanosis (which would have been dangerously severe to produce persistent cyanosis), generalized duskiness is therefore attributable to coloration of the dermis/epidermis, causes of which, as the kidney fails to eliminate waste products (uremia), include *hemosiderin deposition* (gray), urochromes (yellow), and melanin from elevated levels of melanocyte-stimulating hormone.
3. Continual chills (i.e., chilliness) – *Hypothermia* is commonly encountered in the untreated uremic patient as the disease progresses.
4. Hypesthesia (hypoesthesia) – There is a decrease in skin sensation in uremia because of *uremic neuropathy*.
5. Epidermal peeling – This represents *uremic xerosis* and *ichthyosiform* changes of the epidermis.
6. Pitting edema – This excludes myxedema, the generalized thickening of the skin seen in severe hypothyroidism (also a cause of marked tiredness, facial puffiness, and hypothermia) from the differential diagnosis, for myxedema is non-pitting.
7. Tremor – “Uremic twitching” is a syndrome that results from *uremic encephalopathy* and is a combination of myoclonus and asterixis often associated with muscle cramps, tetany, and seizures.
8. Shortness of breath – Kidney failure leads to fluid in the lungs, although severe anemia that develops in advanced kidney failure also can cause *dyspnea on exertion*.
9. Hypotonia – Muscle reflexes and strength, vibration sense, and muscle tone decrease in *uremic neuropathy*.
10. Headache – Common in *uremic encephalopathy*.
11. Brow ptosis – Perhaps an attempted description of edema of the eyelids and orbit.
12. Nightly thirst – Early kidney failure often causes increased

urination at night (*nocturia*). This, however, is not equivalent to thirstiness at night, although nocturia is a likely accompaniment. Assuming the patient was not dehydrated from some external circumstance, “thirst at night” might be considered here to indicate a parallel disease process.⁸

13. Maldigestion – Uremia tends to be associated with constipation rather than diarrhea, but gastroparesis is common, as it is in diabetic neuropathy; gastroparesis is associated with retention of incompletely digested food in the stomach but not in the stool.

From this list it is reasonable to conclude that the patient had chronic kidney failure and, given the early manifestation of anasarca, was afflicted by what was named in the early days of modern medicine Bright disease.⁹ It is now known that Bright disease has a variety of renal causes, but, as in Dr. Bright’s case descriptions, the early stage of disease was a nephrotic syndrome due to massive loss of albumin in the urine, with secondary fluid retention in body tissues leading to anasarca. A reasonable diagnosis for the present cases would be nephrotic syndrome secondary to an immunological nephritis that can run a chronic or recurrent course over years and lead to terminal kidney failure.

⁸ Aretaeus in his treatise *Diut.morb.* (2.2.1) describes the severe thirst (δίψος ἀκρατές) and polyuria associated with what has been considered to be the first clear recognition of diabetes mellitus, stating that it can μακρῶ κίσκεται χρόνῳ (develop over a long time). While I consider his descriptions to suggest not only diabetes mellitus but also other causes of polyuria, including nephrogenic diabetes insipidus, early kidney failure, and the diuresis of recovery from acute tubular necrosis following an acute illness, the point to be made here is that thirst at night may be a clue to the underlying cause of nephrotic syndrome.

⁹ James Tyson, *A Treatise on Bright’s Disease and Diabetes*² (Philadelphia 1904) 80. This textbook reviews the early discoveries of Dr. Richard Bright and others regarding kidney disease and its association with ascites and albuminuria. It is of interest to note that Dr. Tyson, even in 1904, also included becoming cold, wet, or fatigued as predisposing factors to Bright disease (see 184–185). Dr. Bright’s original publication was *Reports of medical cases, selected with a view of illustrating the symptoms and cure of diseases by a reference to morbid anatomy* I–II (London 1827–1831).

Paragraph 2, therapy:

When you have a patient like this, give him (1) vapor baths and (2) spurge flax or (3) hippopheos or (4) Cnidian berry to drink. After this catharsis give what was given to previous patients. The next day give him (5) three quarts of donkey milk to drink twice a day, offering salt. For dinner in the evening he can have bread and boiled meat or octopus cooked in dark wine [being eaten]. Let him drink the sauce. Then let him have lentils prepared in this way: a cup of lentils being boiled, then mixing in finely ground wheat-meal, (6) silphium and grated salt to be offered, and garlic boiled with wine vinegar poured in as necessary; boil two or three times stirred together with added water. It should be smooth when eaten, and not too thick. (7) Boiled pennyroyal can be added for fragrance. In between all this (8) vomiting is to be induced every six days, and a vapor bath is necessary from time to time before the taking of emetics and [other] medicines. Bathe him every third day if it helps, but if not he can be anointed, and he can walk about if possible, depending on nutritional intake. Both (9) boiled elder tree leaves and tender (10) fleabane should be given for drink.

Comment: The relevant therapeutic points in this paragraph are the following:¹⁰

1. vapor (steam) baths were prescribed by Hippocratic physicians to increase sweating and thereby rid the body of fluid and noxious substances via sweating. In uremia this would have helped relieve to a mild degree the edema. Potassium is elevated in the sweat of uremic patients, and perhaps this helped prevent the heart arrhythmias of hyperkalemia. Uremic toxins and sodium are also excreted and lower blood urea levels have been documented. In early modern studies of steam baths a feeling of well-being and relief of uremic pruritis were noted, and there remains even today some interest in this procedure (now called “dermodialysis”) as an adjunctive therapy for uremia.¹¹

¹⁰ Dioscurides is cited by the enumerated herb in Osbaldeston/Wood, followed by [W.] with the enumeration of Max Wellmann, *Pedanii Dioscuridis de Materia Medica* (Berlin 1906–1914).

¹¹ D. J. Vance, “Dermodialysis – Could sweating treatments for chronic

2. κνέωρον (Spurge flax) – *Daphne cnidium* – Thymelaia (Dioscorides 4.172 [4.173 W.]); its herbal reputation includes diuresis, and it “purges bile, phlegm, and water downward” (καθαίρει κάτω ὕδωρ καὶ χολὴν καὶ φλέγμα), although I can find no scientific support for this belief.
3. ἰππόφρεως (Hippopheos) – *Euphorbia sp.* Diuresis has been shown in modern studies using *E. hirta* in rats, and the genus *Euphorbia* includes many in which a diuretic effect has been proven or claimed. But the specific species scholars have attached to the Hippocratic herb is *E. acanthothamos*, for which I find no report of diuretic activity. The herbs mentioned in Diosc. 4.163 [4.159 W.] and 4.167 [4.166 W.] are ἰπποφάεξ and ἰππόφαιστον, and both were thought to expel water. Identification of the Hippocratic herb remains uncertain, as is its purpose as a diuretic. LSJ^B (1897) placed all terms of hippopheos under one heading, ἰπποφάεξ.
4. ὁ Κνίδιος κόκκος (Cnidian berry) – considered the same as (2) above.
5. much donkey milk, a source of complete protein that could help replace that which is lost in the urine, although this may not be a good thing to do. Perhaps it was given to counteract the effects of uremic anorexia. Importantly, milk in the Classical era was not a dietary staple and can therefore be looked upon as a specific form of medical treatment. Donkey milk is more ‘purgative’ than cow milk and thus may have benefited a tendency to constipation that can occur in the uremic patient. It is also closer to human milk in many of its constituents and its taste is said to be preferred.
6. silphium – modern identification of the herb is uncertain,¹² although in the Classical era it was a popular aphrodisiac, and erectile dysfunction is common in men with kidney failure.
7. γλήχων (pennyroyal, Diosc. 3.36 [3.31 W.]) – *Mentha pulegium* smells like spearmint.

renal failure substantially and feasibly improve outcomes in developing and even developed world contexts?” *Global Journal of Medicine and Public Health* 5.1 (2016), <http://www.gjmedph.com//Uploads/Comm2-V05No1.pdf>.

¹² Ken Parejko, “Pliny the Elder’s Silphium: First Recorded Species Extinction,” *Conservation Biology* 17 (2003) 925–927.

8. induced periodic vomiting, by losing gastric acid, would assist in controlling the acidosis of uremia. This has been shown in human studies.
9. κόνυζα (fleabane) – *Erigeron sp.*; see Diosc. 4.97 [4.96 W.] for kidney stones and 3.136 [3.121 W.] for painful urination; it has been shown to be anti-inflammatory and to decrease melanin pigmentation in rat studies. It also contains several glycosides (digitalis is a glycoside); some view it as a diuretic.
10. ἀκτῆς φύλλα (ἀκτέα) – *Sambucus nigra* (elder leaves; see Diosc. 4.174, ?4.175 [both listed under 4.173 W.]) – used as a diuretic (among a myriad of its supposed uses), but evidence is limited.

It appears that the actions of the therapies assigned for treating this advancing case of εἰλεός would, at least in principle, help decrease the edema, serum potassium, and uremic toxins, provide acceptable protein to replace that being lost in the urine, and help moderate acidemia, and thus are theoretically somewhat consistent with therapy of nephrotic syndrome and chronic kidney failure with its uremic manifestations before the modern development of dialysis.¹³

Paragraph 3, prognosis:

Being treated thus, if followed through, should provide easy passage, and the disease should remit in about a year. But many, having become healthy, can have a recurrence after two years; should it return it is necessary for the same treatment to be given. And should it recur a third time, there is usually (1) no edema, [instead] the patient becomes skinny and (2) cachectic.

¹³ This list of therapies for evolving renal failure can be compared to the following therapies for “chronic nephritis” in a prominent American textbook of Internal Medicine published in 1921: a light diet, removal to a warm climate during winter, saline purges, enhanced sweating by hot baths, periodic milk diets, otherwise a liter of milk daily, rest, and phlebotomy. To these were added digitalis for cardiac enlargement, morphine for agitation, chloroform for seizures, and nitroglycerin if it made the patient feel better. The latter medicines would have helped an acute complication of uremia, but management of the underlying kidney failure in 1921 was not too different from that of Hippocratic Greece. See William Osler and Thomas McCrae, *The Principles and Practice of Medicine*⁹ (New York 1921) 705–706.

At the onset the face is thin and the complexion is (3) very white, more so than before. Sometimes (4) fluid collects in the abdomen; should it develop thus, (5) do not incise [the abdomen for drainage] for it will be fatal; treat these patients as you would those with splenic ascites. It is especially important for patients thus to be managed from the beginning, for health can be quickly produced. But the disease is in need of attention, for it can be difficult.

Comment: The patient's condition is approaching terminal. Evidence of advanced manifestations of renal failure and its management, as numerically identified in the translation, include:

1. less edema – tends to occur because of anorexia and decreasing fluid intake in late untreated kidney failure.
2. cachexia – *protein-energy wasting* characteristic of uremia.
3. pallor – becomes more prominent as *anemia* becomes severe (lack of the hormone erythropoietin, made in the kidney to stimulate production of red blood cells).
4. ascites – a late development (*nephrogenic ascites*), but could be a consequence of unrelated concomitant liver disease. This is not the hepatorenal syndrome in which liver damage precedes renal damage.
5. avoid paracentesis for fear of causing fatal bacterial peritonitis, a modern concern.

The two notable exceptions to appropriate therapy are the great volume of donkey milk and the added salt. Milk at approximately six quarts per day would fulfill the daily recommendation of protein for a normal adult, and the addition of salt would tend to worsen fluid retention. Nephrotic syndrome and uremia patients are advised to have a relatively low protein and salt intake. Having said this, it should be noted that not much more than a century ago a “milk diet” of two-and-a-half liters per day was recommended by some physicians for “nephritis,” including “hydrops,” although primarily for acute management, and a half-liter of milk daily was otherwise ad-

vised, perhaps acceptable in part because the salt content of milk is relatively low.¹⁴

Chapter 45

Paragraph 1, clinical status:

Another retention disease: it intervenes primarily in the summer and in wet regions. It tends to break out by means of the drinking of water; but many, being lulled to sleep while directly exposed to the sun, were affected by the disease, suffering from headaches. All those afflicted resemble the preceding, except for the complexion, for they become sallow as if from pomegranate rind; as for the eyes, they become filled with icterus.

Paragraph 2, therapy:

Thus, whoever has this, treat in the same way as in the preceding [patients]: they are [also] to be given both the liquid from boiling of white chick-peas, pouring in some wine, and cleanse the patient's head by means of square-berry. Thus, in fewer than the preceding [it is] lethal; and it is called an "icteric disease of retention."

Comment: the first two sentences of this section are uninterpretable, and so the following statement on the similarity of this group to that in chapter 44 cannot be assumed with certainty. A mild degree of yellowness of the skin can be seen in uremic patients because urochromes are not cleared from the blood by the kidneys. But the deeper yellow-orange of the pomegranate suggests that these patients had liver disease in addition to the nephrotic syndrome and chronic kidney failure, perhaps representing a subgroup of εἰλεοί in which the edema is due to a separate problem, e.g., liver cirrhosis. But ascites is usually a late development in evolution of liver cirrhosis, and it is only then that peripheral edema sometimes can be seen. So, taken at face value that some of the previously edematous patients

¹⁴ L. W. Littig, "Nephritis, its Modern French Perception," *Medical Herald* 32 (1913) 374–378; E. F. Wells, "Management of Failure of the Circulatory Balance in Chronic Interstitial Nephritis," *The American Journal of Medical Sciences* 143 (1912) 25–36.

are now jaundiced, it will be assumed that this is due to advancing kidney failure and that local pomegranates may have been a pale yellow. Nevertheless, in face of icterus the orientation of the author's therapy now becomes the liver:

1. Square-berry (*Euonymus sp. [?alatus]*); not listed by Dioscorides) has been used in herbal therapy for liver disease with fever, constipation in liver disease, and is a "cholagogue" promoting "free flow of bile," but modern study has focused on its potential for treating diabetes mellitus because of its hypoglycemic effects, with no comment on hepatic actions.¹⁵
2. Chickpeas (*Cicer arietinum*) have been used for liver diseases, and now have been shown to have a hepatic protective effect in rats given the hepatotoxic CCl₄. They also have a high protein content.¹⁶

Thus, the additional therapy, based on contemporary herbalist thinking, was, purposely or not, targeting the icterus (it was probably not known that icterus could be caused by liver disease), whereas the baseline therapy (ch. 44) targeted the edema.

Chapter 46

Paragraph 1, clinical status:

Another disease of retention: this afflicts a greater number [of patients] than those in the preceding section, and the disease begins in late autumn by manifesting the following: (1) the breath has a bad smell, (2) the gums separate from the teeth, and (3) there is bleeding from the nostrils. Sometimes (4) ulcers erupt on both legs, and when some heal others appear, and (5) the complexion is dark and (6) the skin thin (atrophied); and they are not eager to wander or to endure hardship.

¹⁵ X. Zhai, G. B. Lenon, C. C. Xue, C.-G. Li, "Euonymus alatus: A Review on its Phytochemistry and Antidiabetic Activity," *Evidence-Based Complementary and Alternative Medicine* (2016), <https://doi.org/10.1155/2016/9425714>.

¹⁶ R. Mekky, M. Fayed, M. El-Gindi, et al., "Hepatoprotective Effect and Chemical Assessment of a Selected Egyptian Chickpea Cultivar," *Frontiers in Pharmacology* 7 (2016), <https://doi.org/10.3389/fphar.2016.00344>.

Paragraph 2, therapy:

Whenever you have such a patient, he is to be treated as the previous ones; lavage them (give an enema) this way: five leaves of the squirting cucumber are to be gently rubbed and mixed with half a cup of honey, a handful of salt, half a cup of oil, and then give four cups of boiled beet juice, and a laxative of eight cups of donkey milk mixed with honey. Drink cow milk in season [i.e., distinct from the calving season] for forty-five days; then early in the morning drink two cups of cow milk mixed with a sixth of a cup of honey on days in between. This disease requires careful management; if care is not taken it will not be cured and the patient will die; it is called “hemorrhagic disease of retention.”

Comment: In addition to the edema and other signs and symptoms as outlined in chapter 44, the new ones indicate different complications:

1. Bad smell – *uremic fetor* is the smell of ammonia present on a patient’s breath in advanced kidney failure.
2. Gum disease – suggests *uremic stomatitis* and *malnutrition*, the latter a common consequence of the profound anorexia associated with kidney failure.
3. Epistaxis – *defective hemostasis* is a prominent feature in kidney failure primarily because of abnormal platelet function; usually with *purpura* and *ecchymoses*.
4. Leg ulcers – occurring over time, some healing; due to *impaired immunity* and uncommonly *calciophylaxis*, a consequence of calcium deposition in the microvasculature of the skin in chronic kidney failure.
5. Dark skin – from the *deposition of hemosiderin* and the elevated levels of melanocyte-stimulating hormone seen in chronic kidney failure.
6. Thin skin – skin thickness in chronic kidney failure tends to be increased when there is edema, so the significance of this observation is unclear. If edema had cleared in this terminal state, the statement would be true.

Leaves of the squirting cucumber (*Ecballium elaterium*, Diosc. 4.155 [4.150–151 W.]) do have anti-inflammatory activity and inhibit protein breakdown, as shown in studies in rats, and any part of the plant has potent activity against mucosal surfaces

that produces a profound watery diarrhea when given orally or as an enema. Its value in treating “dropsy,” therefore, is much documented in medical literature. It may have been used in very advanced kidney failure because it is considered the most potent stimulator of fluid release of the herbal literature, the diarrhea having been described as “choleraic.” The comments on milk therapy are uninterpretable unless the patient could tolerate only a liquid diet. Cow milk was considered less purgative than donkey milk, and milk is becoming colostrum-rich in the month prior to calving.

III. ειλῆός as nephrotic syndrome and kidney failure

Of the author’s three types of ειλῆός in *Internal Affections*, the first (ch. 44) is generalized edema in which the associated signs and symptoms best fit the early 19th-century descriptions of Bright disease, now known to be approximated by many types of kidney disease, both acute and chronic, but typically including the nephrotic syndrome with its generalized edema. As the spleen was not said to be enlarged and ascites and icterus were late in developing, the author apparently considered that the initial and dominant problem was the edema, and therefore the kidneys were not doing their job in ridding the body of fluid. Treatment was directed at helping them out. For the second scenario (ch. 45), the additional finding is icterus, and the retention of urochromes in renal failure will lead to mild icterus, although unrelated causes of icterus, usually liver disease, developing in the uremic patient are not rare. The therapy, purposely or not, was oriented at the liver. The third scenario (ch. 46) suggests that protein malnutrition secondary to the profound anorexia of advancing kidney failure has evolved. The darkened skin, stomatitis, and skin ulcers are seen in advanced uremia, and a bleeding diathesis due to impaired platelet function is always present in kidney failure.

Thus, the cause of many of the signs and symptoms presented in the text is consistent with loss of the excretory function of the kidney. But an important exception is loss in the urine of albumin, for it is not supposed to be excreted by a normal kidney and its loss reflects damage to the filtering

mechanism of the kidney. None of this, however, was known to the author. Nevertheless, because of the generalized edema it was reasonable for him to conclude that there was inadequate production of urine, i.e., he assumed that all the water in the “puffy” tissues indicated that some urine was being retained.

It is possible, therefore, to view chapters 44–46 of *Internal Affections* as describing a single disease category in stages of development: nephrotic syndrome with progression to terminal kidney failure, with clinical similarities to Bright disease. But such a clean distinction is unlikely, and chapters 44–46 probably include other disorders that share some clinical features:

1. To be considered are nutritional deficiencies, for the great attention given to diet by ancient physicians may have been prompted in part by experience with diets that seemed markedly beneficial in some patients whom we might now recognize to have been nutritionally deficient. But major scourges such as beriberi, scurvy, kwashiorkor, and pellagra are epidemiologically highly unlikely. Scurvy, kwashiorkor, and pellagra might conceivably have developed in times of war and adversity (and milk was a prominent dietary component in therapy of beriberi and pellagra a century ago), but social unrest is not mentioned in *Internal Affections*.¹⁷
2. Chronic renal failure also can be caused by toxic exposure to certain metals and their salts, and cadmium, lead, chromium, mercury, and beryllium are chief among these. But nephrotic syndrome is clearly identified only with mercury poisoning, and its other signs and symptoms include twitching, tremors, dermatitis, loosening of teeth, dysesthesia, and failure. But mercury toxicity would likely have been associated with mining of gold, and there is no mention of this by the author and the heaviest exposure would have occurred among the slaves who worked the mines rather than patients of Hippocratic physicians.

¹⁷ Dr. James Lind, in his classic *Treatise on the Scurvy*³ (London 1772) 285, noted that some think Hippocrates was describing scurvy in *Internal Affections* ch. 46, although he cited that chapter as the third type of “volvulus.” Littré (cf. n.1 above) considered ch. 46 to describe scurvy and 44 and 45 to be possible scurvy.

But beyond mere clinical overlap of differing diseases and the resulting confusion, there is also the question of the basis of the author's nosological classification. While this paper has presented ειλῆός as applicable to kidney disease, the author of *Internal Affections* would not have known that the cause of swelling was in fact renal in origin. He merely assumed that retention of fluid was caused by a failure to excrete it. In this sense, icterus as described in chapter 45 might also have been viewed as a "retention" disease because the "icterus" was not being properly excreted. Likewise, a review of Hippocratic works does not indicate that it was known to their authors that icterus could be caused by liver disease, but, had the author of *Internal Affections* thought that, chapter 45 might have been described as "hepatic retention disease." Seen in this light there could be a multitude of nosological subdivisions, a concern addressed by Dr. A. Roselli (n.3 above). In chapter 46, however, ειλῆός αἱματίτης ("sanguinous ileus" as translated by Potter) is not a separate nosological entity that could be termed "retention disease of blood" for that is clearly not the message of the chapter, the relevant issue being bleeding (epistaxis), not retention of blood. It seems logical, therefore, to consider the subjects of chapters 45 and 46 to be variants of the subject of chapter 44 rather than unique types of ειλῆός, and that πρόσθεν as used in 45 and 46 indeed refers to the swelling and other characterizations of the illness as fully addressed in the opening paragraph of 44.

By excluding possible but unlikely causes of ειλῆός as employed in *Internal Affections* 44–46, it is proposed that medically relevant translations of ειλῆός be broadened to encompass disorders whereby that which is normally excreted is retained. This would encompass both "ileus" of the bowel and the nephrotic syndrome of kidney disease, even though it is now known that the edema of the nephrotic syndrome is due to water retention because of low serum albumin levels rather than an excretory problem. But the concept can be broadened further. If we apply this new interpretation to *Aphorisms* 6.44,

what was to Galen a puzzling aphorism becomes a straightforward statement about urinary obstruction.¹⁸ W. H. S. Jones (in the Loeb, 1931: IV 189) translated *Aphorisms* 6.44 as: “Those who, after strangury, are attacked by ileus, die in seven days, unless fever supervenes and there is an abundant flow of urine.”¹⁹ With the present interpretation the translation should read: “Those with strangury who develop urinary retention die in seven days, unless fever supervenes and there is an abundant flow of urine.” An “abundant flow of urine” would indicate that the cause of urinary tract obstruction had eased, at least partially, thus reversing the ειλῆός. The aphorism shows that true urinary retention, this time without edema, was also viewed by its author as an ειλῆός.

In conclusion, while subsequent generations of physicians assumed a narrow interpretation of ειλῆός, the perceptive authors of *Internal Affections* and *Aphorisms* 6.44 would broaden the nosological identity of ειλῆός from a merely descriptive term to one based on a presumed physiology.

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¹⁸ For the statement about Galen (“puzzling”) see Francis Adams, *The Genuine Works of Hippocrates* II (New York 1886) 257. With the expanded definition of ειλῆός the aphorism would not be saddled with the implication of bowel obstruction. Additional comment: without treatment, complete urinary obstruction in humans is lethal within a week.

¹⁹ ὁκόσοισιν ἐκ στραγγουρίας ειλῆοὶ γίνονται, ἐν ἑπτὰ ἡμέρησιν ἀπόλλυνται, ἢν μὴ, πυρετοῦ ἐπιγενομένου, ἄλις τὸ οὔρον ῥυῆι.