

**BARTTER  
SYNDROME,  
GITELMAN  
SYNDROME  
AND  
HOMOEOPATHY**

© Dr. Rajneesh Kumar Sharma  
MD (Homoeopathy)

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## Etymology

- Described by Bartter and colleagues in 1962
- Salt-Losing Tubulopathy with Secondary Hyperaldosteronism

## Definition

Bartter syndrome and Gitelman syndrome, both are characterized by fluid, electrolyte, urinary, and hormonal abnormalities, as well as renal potassium, sodium, chloride, and hydrogen wasting; hypokalemia, hyperreninemia and hyperaldosteronism without hypertension; and metabolic alkalosis. (Psora/ Syphilis)

- Findings include electrolyte, growth, and sometimes neuromuscular abnormalities. (Psora)
- Both syndromes have impaired sodium chloride reabsorption, which causes mild volume depletion, leading to increases in renin and aldosterone release, resulting in urinary potassium and hydrogen losses. (Psora)
- Manifestations vary depending on genotype, but growth and development may be affected and electrolyte abnormalities may cause muscle weakness, cramping, spasms, tetany, or fatigue. (Psora/ Syphilis)

## Pathophysiology

Salt loss  $\rightarrow$  Volume depletion  $\rightarrow$  Renin/aldosterone secretion / JGA hyperplasia  $\rightarrow$  Autonomous hyperreninemic hyperaldosteronism  $\rightarrow$  Enhanced K and H secretion at the collecting tubule  $\rightarrow$  Hypokalemia and metabolic alkalosis as result

- Both Bartter as well as Gitelman syndromes result from deranged sodium chloride reabsorption. (Psora)
- In both syndromes, the impairment of sodium chloride reabsorption causes mild volume depletion, which leads to increase in renin and aldosterone release, resulting in potassium and hydrogen losses. (Psora/ Syphilis)
- In both disorders, sodium wasting contributes to a chronic mild plasma volume contraction reflected by a normal to low BP regardless of high renin and angiotensin levels. (Psora)
- The features at clinical presentation vary in both syndromes.
- In Bartter syndrome, the defect is in the ascending thick limb of the loop of Henle while in Gitelman syndrome, the defect is in the distal tubule. (Psora/ Syphilis)
- In Bartter syndrome, there is increased prostaglandin secretion as well as a urinary concentrating defect due to decreased generation of the medullary concentration gradient. (Psora)
- Gitelman syndrome is the more common.
- In Gitelman syndrome, hypomagnesemia and a low urinary calcium excretion are common. (Psora)

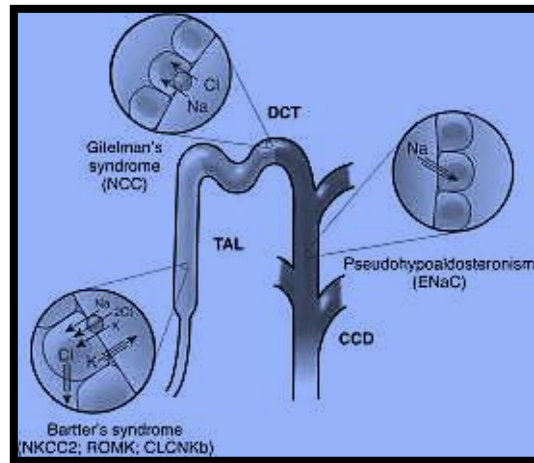
## Pathophysiology of Bartter's syndrome

Persons with Bartter syndrome often have hypercalciuria. Normally, reabsorption of the negative chloride ions promotes a lumen-positive voltage, driving paracellular positive calcium and magnesium absorption. Continued reabsorption and secretion of the positive potassium ions into the lumen of the thick ascending loop of Henle (TALH) also promotes reabsorption of the positive calcium ions through paracellular tight junctions. Dysfunction

of the TALH chloride transporters prevents urine calcium reabsorption in the TALH (Psora). Excessive urine calcium excretion may be one factor in the nephrocalcinosis observed in these patients (Psora). Calcium is usually reabsorbed in the distal convoluted tubule (DCT). Theoretically, chloride is reabsorbed through the thiazide-sensitive sodium chloride cotransporter and transported from the cell through a basolateral chloride channel, reducing intracellular chloride concentration (Psora). The net effect is increased activity of the voltage-dependent calcium channels and enhanced electrical gradient for calcium reabsorption from the lumen. (Psora)

## Pathophysiology of Gitelman's syndrome

In Gitelman syndrome, dysfunction of the sodium chloride cotransporter (NCCT) leads to hypocalciuria and hypomagnesemia. (Psora)



## Differences Between Bartter Syndrome and Gitelman Syndrome

Feature	Bartter Syndrome	Gitelman Syndrome
Location of kidney defect	Ascending loop of Henle (mimics effects of loop diuretics)	Distal tubule (mimics effects of thiazides)
Urinary calcium excretion	Normal or increased, commonly with nephrocalcinosis	Decreased
Serum magnesium level	Normal or decreased	Decreased, sometimes greatly decreased
Renal prostaglandin E2 production	Increased	Normal
Typical age at presentation	Before birth to early childhood, often with intellectual disability and growth disturbance	Late childhood to adulthood
Neuromuscular symptoms (muscle spasms, weakness etc.)	Uncommon or mild	Common

## Etiology

- Both syndromes are usually autosomal recessive, though sporadic cases and other types of familial patterns can occur (Syphilis)
- There are many genotypes of both syndromes (Psora)
- Different genotypes may have different manifestations (Psora/ Syphilis)

## Symptoms and Signs

- Patients have a history of maternal polyhydramnios and premature delivery
- Polyuria
- Polydipsia
- Vomiting
- Constipation
- Salt craving
- Tendency for volume depletion
- Failure to thrive
- Linear growth retardation

Other symptoms, which appear during late childhood, include-

- Fatigue, muscle weakness, cramps, and recurrent carpopedal spasms
- Developmental delay and minimal brain dysfunction with nonspecific electroencephalographic changes

## Bartter syndrome

- Tends to manifest prenatally or during infancy or early childhood
- Can manifest prenatally with intrauterine growth restriction and polyhydramnios
- Different forms of Bartter syndrome can have specific manifestations, including hearing loss, hypocalcemia, and nephrocalcinosis, depending on the underlying genetic defect
- More commonly, the children with Bartter syndrome may be born prematurely and may have poor growth and development postnatally, and some children have intellectual disability

## Gitelman syndrome

- Gitelman syndrome tends to manifest during late childhood to adulthood
- Most patients have low or low-normal BP and may have signs of volume depletion
- Inability to retain potassium, calcium, or magnesium can lead to muscle weakness, cramping, spasms, tetany, or fatigue are more common with Gitelman syndrome
- Polydipsia, polyuria, and vomiting may be present in both syndromes
- In general, neither Bartter syndrome nor Gitelman syndrome typically leads to chronic renal insufficiency

## Types

There are two types of Bartter syndrome-

### Neonatal Bartter syndrome

- Mostly neonatal Bartter syndrome is seen between 24 and 30 weeks of gestation with excess amniotic fluid (polyhydramnios).
- After birth infant presents with polyuria, and polydipsia
- Life-threatening dehydration may result if the infant does not receive adequate fluids.
- Most of affected infants have hypercalciuria and nephrocalcinosis
- In rare occasions, the infant may progress to renal failure

## Classic Bartter syndrome

- Patients with classic Bartter syndrome may have symptoms in the first two years of life, but they are usually diagnosed at school age or later
- Neonatal vs Classic Bartter- Like infants with the neonatal subtype, patients with classic Bartter syndrome also have polyuria, polydipsia, and a tendency to dehydration, but normal or just slightly increased urinary calcium excretion without the tendency to develop kidney stones
- Vomiting and growth retardation
- Prenatal Bartter syndrome can be associated with polyhydramnios

## Classification

### Bartter syndrome type 1

- Loop disorder type 1, Neonatal Bartter's syndrome
- Gene affected- SLC12A1 (NKCC2)
- Defect- Na-K-2Cl symporter

### Bartter syndrome type 2

- Loop disorder type 2, Neonatal Bartter's syndrome
- Gene affected- ROMK/KCNJ1
- Defect- thick ascending limb K<sup>+</sup> channel

### Bartter syndrome type 3

- DCT disorder type 2, Classic Bartter syndrome
- Gene- CLCNKB
- Defect- Cl<sup>-</sup> channel

### Bartter syndrome type 4

- Loop-DCT disorder type 1, Bartter's syndrome with sensorineural deafness
- Gene- BSND
- Defect- Cl<sup>-</sup> channel accessory subunit

### Bartter syndrome type 5

- Loop-DCT disorder type 2, Bartter's syndrome associated with autosomal dominant hypocalcemia
- Gene- CASR
- Defect- activating mutation of the calcium-sensing receptor

## Gitelman syndrome

- DCT disorder type 1, hypocalciuria hypomagnesemia syndrome
- Gene- SLC12A3 (NCCT)
- Defect- Sodium-chloride symporter

## Diagnosis

- Serum and urine electrolyte levels
- Characteristic symptoms or incidentally noted laboratory abnormalities, such as metabolic alkalosis and hypokalemia

- Urine electrolytes showing high levels of sodium, potassium, and chloride that are inappropriate for the euvolemic or hypovolemic state of the patient
- Definitive diagnosis is through genetic testing
- A 24-h measurement of urinary calcium or the urine calcium/creatinine ratio may help distinguish the two syndromes. These levels are typically normal to increased in Bartter syndrome and low in Gitelman syndrome
- Electrocardiogram (ECG) may reveal changes characteristic of hypokalemia, such as flattened T waves and prominent U waves
- Although renal biopsy is not usually required, histologic findings may be useful in confirming the diagnosis of Bartter syndrome

## Differential diagnosis

The clinical findings characteristic of Bartter syndrome are hypokalemia, metabolic alkalosis, and normal to low blood pressure. These findings may also be caused by-

- Chronic vomiting
  - These patients will have low urine chloride levels (Bartter's will have relatively higher urine chloride levels).
- Abuse of diuretics
- Magnesium deficiency and Calcium deficiency
  - These patients will also have low serum and urine magnesium and calcium
  - Patients with Bartter syndrome may also have elevated renin and aldosterone levels

## Pseudo-Bartter's syndrome

- It is a syndrome of similar presentation as Bartter syndrome but without any of its characteristic genetic defects
- Pseudo-Bartter's syndrome has been seen in cystic fibrosis, as well as in excessive use of laxatives

## Complications and Prognosis

- Significant morbidity and mortality occur if Bartter syndrome is untreated
- Long-term prognosis remains guarded because of the slow progression to chronic renal failure due to interstitial fibrosis
- Sensorineural deafness
- Nephrocalcinosis
- Renal failure is fairly uncommon in Bartter syndrome
- Acute renal failure from rhabdomyolysis due to hypokalemia
- Short stature and growth retardation
- Cardiac arrhythmia and sudden death may result from electrolyte imbalances
- Failure to thrive and developmental delay
- Significant decrease in bone mineral density

## Treatment

- Potassium and Magnesium supplementation is often necessary
- Exogenous growth hormone can be considered to treat short stature

## Homoeopathic treatment

### Short repertory of Bartter and Gitelman syndrome

GENERALS - CONVULSIONS - tonic acon. agar. alum-p. alum-sil. alum. am-c. am-m. ambr. anac. **ANG.** ant-t. apis arg-met. arn. ars. asaf. asar. **BELL.** borx. bry. **BUFO** **Calc.** camph. cann-s. canth. caps. carb-n-o. **Caust.** **Cham.** chin. chlf. **CIC.** cina clem. cocc. coloc. con. croc. cupr. cur. cycl. dig. dulc. euph. ferr-ar. **Ferr.** graph. guaj. hell. hep. hydr-ac. hyos. hyper. **Ign.** **Ip.** kali-c. lac-e. lath. laur. led. **Lyc.** m-ambo. m-arct. mag-p. mang. med. meny. **Merc.** mez. **Mosch.** nat-c. nat-m. nit-ac. **Nux-m.** nux-v. oena. olnd. op. **PETR.** ph-ac. **Phos.** phys. phyt. pic-ac. **PLAT.** **Plb.** puls. rhod. rhus-t. sabad. sars. **Sec.** seneg. **SEP.** sil. spig. spong. squil. stann. **STAPH.** **Stram.** **Stry-s.** stry. **Sulph.** sumb. tab. thuj. **Upa.** verat-v. **Verat.** visc. zinc-p. zinc.

GENERALS - DEVELOPMENT - arrested **Agar.** aloe ant-c. bac. **Bar-c.** bar-m. bar-p. bar-s. borx. bufo **CALC-P.** **Calc.** **Carc.** cupr. des-ac. hypoth. kreos. lyc. nat-m. nep. ol-an. **Phos.** rad-br. rhod. **Sil.** sulfa. syph. thym-gl. thyr. toxo-g. tub. vip.

GENERALS - DEVELOPMENT - slow bac. bar-c. bufo calc-p. **Calc.** caust. cupr. kreos. lac-d. mag-m. med. nat-m. pin-s. sil. sulph. thyr. toxo-g.

GENERALS - FOOD and DRINKS - salt - desire abrom-a. acet-ac. aegop-p. aeth. agar. **Aloe** alumin-p. am-caust. **Ambr.** anac. ant-m. anthraq. **Aq-mar.** arg-met. **ARG-N.** arg-p. atp. atro. aur-m-n. aur-m. bac. bar-m. beryl-m. **Beryl.** bit-ar. brosgau. cadm-m. calc-f. **Calc-p.** calc-s. calc-sil. **Calc.** **Cand.** **CARB-V.** **Carc.** cassia-s. caste. **Caust.** **Chin.** chinin-m. **Chlor.** chord-umb. chr-m. cob-m. cocc. coch. **Con.** **Cor-r.** cupr-m. cupr-p. dulc. dys. ferr-n. fuma-ac. galeoc-c-h. galin. germ-met. gink-b. **Glycyr-g.** halo. ham. hydrog. jal. kali-p. kali-s. kali-sil. lac-ac. **LAC-C.** lac-h. lac-leo. lith-m. lith-p. **Lycps-v.** **Lyss.** mag-n. mag-p. mag-sil. **Manc.** mang-m. mang-n. mang-p. mang-sil. **Med.** medus. meph. merc-d. merc-i-f. merc-i-r. merc. **Moni.** morg-g. morg-p. morg. mur-ac. nat-ar. nat-br. nat-c. **Nat-caust.** nat-f. nat-lac. **NAT-M.** **Nat-met.** nat-p. nat-pyru. nat-s. nat-sil. **Nit-ac.** nit-s-d. nitro. orot-ac. oxal-a. ozone pers. petr-ra. ph-ac. **PHOS.** pin-con. plb-m. **Plb.** plut-n. podo. prot. rat. rhus-g. ruta sabin. sacch. sal-ac. **Sanic.** scarl. sel. sep. ser-ang. sil-met. sil. sol spong. staph. stront-m. suis-em. sul-ac. sulfonam. sulph. suprar. syc. **Tarent.** tax. tell. teucr. **Thuj.** tritic-vg. **Tub.** tung-met. uva vanil. **VERAT.** zinc-n. zinc.

GENERALS - GROWTH - complaints of growth process bar-c. calc-p. calc. ph-ac. phos. sil. **Thyr.**

GENERALS - PAIN - Muscles - cramping abrot. acon. agar. alum. am-c. am-m. **Ambr.** **ANAC.** **ANG.** **Ant-t.** arg-met. **Arn.** **Ars.** **Asaf.** asar. aur. bar-c. **BELL.** bism. bov. brass-n-o. bry. bufo **CALC.** camph. **Cann-s.** canth. caps. carb-an. carb-v. carb-n-s. **Castm.** **Caust.** cham. **Chel.** chin. cho. cic. cimid. **CINA** clem. **Cocc.** coff. colch. **COLOC.** **Con.** conin. croc. **Cupr-act.** **Cupr-f.** **Cupr-m.** **Cupr-p.** **CUPR.** cyt-l. dig. **Dios.** dros. **Dulc.** euph. **Euphr.** ferr. gels. **Glon.** **Graph.** haliae-lc. hell. hep. hist. hyos. **Ign.** iod. ip. **Iris** jab. **Kali-br.** **Kali-c.** kali-n. kreos. lac-h. lach. lat-m. laur. **LYC.** m-ambo. **M-arct.** mag-c. **Mag-m.** **Mag-p.** mang. meny. **MERC.** mez. morph. mosch. **Mur-ac.** nat-c. nat-f. nat-m. **Nit-ac.** nux-m. **NUX-V.** olnd. **Op.** osteo-a. par. **Petr.** ph-ac. phos. phyt. **PLAT.** plb-act. **Plb.** prot. puls. ran-b. ran-s. rhod. **Rhus-t.** ruta sabad. samb. sang. sarcol-ac. **Sec.** **SEP.** **SIL.** **Spig.** **Spong.** squil. **Stann.** staph. stram. stront-c. **SUL-AC.** **SULPH.** syph. **Tab.** tetox. **Thuj.** trinit. tub-m. **Valer.** vanil. verat. **Verb.** vib. viol-o. viol-t. zinc.

GENERALS - WEAKNESS - Muscular acet-ac. acon. agar. **Agath-a.** **Alet.** alum. alumn. am-c. am-caust. am-m. anac. anh. ant-c. **Ant-t.** **Apis** apoc. arg-n. arn. ars. asaf. aur. **BAR-C.** bar-



m. bell. berb. borx. both-ax. both. Bov. bry. bung-fa. Calc. Camph. cann-xyz. canth. Carb-ac. Carb-v. caust. cham. Chin. Chlol. cemic. clem. cocc. colch. coll. Con. cortico. Croc. crot-c. crot-h. Cupr. dendr-pol. Dig. dioxi. dros. Dulc. elaps euphr. ferr-m. ferr-p. Ferr. GELS. germ-met. graph. guaj. Hell. helon. hep. hydr. hyos. ign. iod. ix. kali-bi. kali-br. kali-c. kali-hp. kali-n. kali-p. kalm. kola laur. Led. lob. Luf-op. Lyc. m-arct. macro. mag-c. mag-m. mag-p. mang. meny. MERC-C. merc. mez. mur-ac. naja Nat-c. NAT-M. NIT-AC. Nux-m. nux-v. olnd. onos. Op. pall. petr. ph-ac. phos. phys. physal-al. PIC-AC. pip-m. Plat. plb-act. Plb. puls. rad-br. rheum Rhod. RHUS-T. Ruta sabad. sarcol-ac. sec. Seneg. senn. Sep. Sil. sin-n. spartin-s. spig. stann. stram. stront-c. stry-p. Stry. sul-ac. Sulph. symph. tab. ter. thuj. thyr. verat-v. Verat. zinc.

GENERALS - WEARINESS Acetan. acon. adam. adlu. aesc. agar. Agath-a. alet. aloe Alum-p. ALUM. Am-c. ambr. Anac. Androc. ang. Anh. Ant-c. Ant-t. aphis aran-ix. aran. arg-met. Arg-n. arist-cl. arizon-l. Arn. Ars-i. ars. asaf. asar. aur-ar. aur-m. aur-s. aur. Bacls-7. Bamb-a. Bapt. bar-c. bar-m. bar-ox-suc. bell-p-sp. bell-p. bell. BENZ-AC. berb. beryl. Bism. Bit-ar. Blatta-a. borx. bov. brass-n-o. Brom. bros-gau. bruc. Bry. cadm-met. cain. calad. calam. calc-f. CALC-P. Calc-sil. Calc. camph. CANN-S. cann-xyz. canth. caps. Carb-ac. carb-an. Carb-v. CARBN-S. carc. cartl-s. Castm. Caust. cecr. cench. cham. CHEL. chin. Chinin-ar. chir-fl. choc. chord-umb. cic. cemic. cimx. cina cist. clem. cob-n. cob. Coc-c. coca-c. cocc. coff. colch. coli. coloc. Con. conch. cordyc. corian-s. cortico. cortiso. CROC. Crot-c. Cupr. cycl. cystein-l. dam. dica. dig. dioxi. diphtox. dros. dulc. dys. enteroc. ephe-si. erig. esp-g. euph. euphr. ferr-ma. ferr-p. FERR-PIC. FERR. fic-m. flor-p. gaba gard-j. GELS. ger-i. germ-met. gink-b. gran. GRAPH. grat. guaj. guat. Ham. harp. hecla hed. hell. helon. Hep. heroin. hist. Hydrog. Hyos. ign. ina-i. influ. interf. iod. Ip. kali-bi. kali-c. kali-chl. Kali-m. kali-n. KALI-P. kali-s. kali-sil. kalm. ketogl-ac. kola Kreos. lac-ac. Lac-e. lac-h. lac-loxod-a. LACH. lact. lap-la. Laur. lavand-a. LEC. led. luf-op. LYC. m-ambo. m-arct. m-aust. Mag-c. mag-f. mag-m. malar. mand. mang. med. melal-alt. meny. meph. MERC. mez. Moni. mosch. Mur-ac. murx. naja Nat-c. NAT-M. Nat-s. nat-sil. neon nep. nicotam. nit-ac. Nux-m. NUX-V. oci-sa. ol-an. Olib-sac. olnd. onos. op. oxal-a. ozone pant-ac. Par. Parathy. petr-ra. Petr. PH-AC. phenob. PHOS. phys. phyt. PIC-AC. Pieri-b. plac-s. plac. Plat. plb. plut-n. polys. positr. pot-e. propl. propr. prot. prun. Psil. Psor. PULS. Pycnop-sa. pyrog. ran-b. rauw. Rheum Rhod. Rhus-t. rib-ac. ribo. Ros-d. RUTA sabad. sabin. samb. sang. saroth. sars. sec. senec. seneg. SEP. sieg. SIL. sinus. spect. spig. spong. squil. Stann. STAPH. Stram. stront-c. suis-em. Sul-ac. sulfa. SULPH. sumb. suprar. syc. Tab. tax. teucr. ther. thioc-ac. thiop. thuj. trinit. tritic-vg. tub-r. tub-sp. TUB. uncar-tom. Urol-h. v-a-b. valer. vanil. vario. Verat. verb. vero-o. viol-o. Viol-t. visc. x-ray zinc-p. ZINC.

HEARING - IMPAIRED abrom-a. achy-a. acon. aeth. agar. agn. Agra. alco. alet. All-c. alum-p. alum-sil. alum. Am-c. Am-m. Ambr. Anac. androc. Ang. ant-c. ap-g. Apis arg-met. arg-n. Arn. ars-i. ars-s-f. Ars. asaf. Asar. aster. aur-ar. aur-i. aur-m. aur-s. Aur. bacls-7. Bapt. BAR-C. bar-i. Bar-m. bar-s. BELL. borx. Bov. Bry. bufo cact. cadm-met. caj. calad. calc-f. calc-i. Calc-p. calc-sil. CALC. calen. cann-i. cann-s. canth. caps. CARB-AN. CARB-V. carbn-o. CARBN-S. CAUST. cedr. cham. cheir. Chel. Chen-a. chin-b. CHIN. chinin-ar. chinin-s. chlf. Chlor. Cic. cemic. cist. cit-v. clem. coc-c. Cocc. coff. colch. coli. coloc. com. Con. conin. cor-r. croc. crot-c. crot-h. Crot-t. CUPR. Cycl. cypra-eg. der. dig. diosm. Dros. dulc. Elaps euph. Euphr. ferr-ar. Ferr-i. ferr-p. ferr-pic. Ferr. Fl-ac. Form. gad. galla-q-r. gamb. gaul. Gels. Glon. GRAPH. grat. guaj. guar. guare. Hell. Hep. hippoc-k. hippoz. hydr-ac. Hydr. hydrobr-ac. HYOS. iber. ign. lod. iodof. Ip. irid-met. jatr-c. kali-ar. Kali-bi. Kali-br. Kali-c. kali-chl. kali-i. kali-m. kali-n. kali-p. kali-s. kali-sil. kalm. kola Kreos. Lach. lachn. Lact. Laur. Led. lepi. lil-t. lob. LYC. m-ambo. m-arct. m-aust. Mag-c. Mag-m. mag-p. mang-act. Mang. med. meny. meph. merc-c. Merc-d. merc-i-r. Merc. merl. mez. mim-p. mosch. Mur-

ac. nat-ar. Nat-c. **NAT-M.** Nat-p. Nat-sal. nicc. nicot. **NIT-AC.** nux-m. **Nux-v.** ol-j. olnd. onos. op. oscilloc. par. peti. petr-ra. **PETR.** **PH-AC.** **PHOS.** phys. physala-p. phyt. plat. **Plb.** podo. positr. psil. **Psor.** **PULS.** ran-b. rham-cal. rheum rhod. **Rhus-t.** rhus-v. rob. **Ruta Sabad.** **Sabin.** **Sal-ac.** salin. **Sang.** sangin-n. sarr. sars. **SEC.** sel. **Sep.** **SIL.** spect. **Spig.** **Spong.** squil. stann. **Staph.** **Stram.** **Sul-ac.** sul-i. **SULPH.** syc. symph. syph. tab. tarax. tarent. **Tell.** tep. teucr. ther. **Thiosin.** thuj. tritic-vg. tub-a. valer. vanil. vario. verat-v. **Verat.** **VERB.** viol-o. wies. zinc-p. zinc.

**KIDNEYS - PAIN** acon. act-sp. **Aesc.** aeth. agar. **Agn.** aids. **All-c.** allox. aloe alum-p. **Alum.** am-br. ambr. anan. androc. ant-t. aphis **Apis** apoc. aran. **Arg-n.** arge-pl. **Arist-cl.** **Arn.** **Ars-h.** ars. arund. **Asaf.** asar. astac. atro. aur-m. aur. bad. bamb-a. bapt. **Bell.** **Benz-ac.** **BERB.** borx. bov. brach. **Bry.** bufo but-ac. **Cact.** cadm-s. cain. **Calc-ar.** calc-f. **Calc-p.** **Calc.** **Cann-i.** **Cann-s.** cann-xyz. **CANTH.** **Caps.** carb-an. **Carl.** **CAUST.** cedr. cere-b. Chel. **Chen-a.** **Chim.** chin. chinin-s. chlf. cimic. cina **Cinnb.** cit-v. **Clem.** cob-n. coc-c. **Cocc-s.** **Cocc.** cod. **COLCH.** coloc. con. conv. cop. cortisol. **Crot-c.** **Crot-h.** crot-t. cund. cur. cycl. daph. dig. **Dios.** **Dulc.** ephe-si. equis-h. erig. ery-a. eup-per. **Eup-pur.** ferr-ar. ferr-i. ferr-m. ferr-p. **Ferr.** gad. gal-ac. galeg. galla-q-r. gamb. **Gels.** gnaph. **Granit-m.** **GRAPH.** grat. guare. guat. ham. **Hed.** hell. helo. **Helon.** **Hep.** hydr. **Hydrang.** hyper. iod. **Ip.** **Ipom-p.** irid-met. iris juni-c. kali-ar. **Kali-bi.** kali-br. **Kali-c.** **Kali-chl.** kali-i. kali-m. kali-n. kali-p. kali-s. kola lac-ac. lac-d. lac-leo. lach. lapa. lat-m. laur. lec. lept. **Lith-c.** lob-s. lob. **Lyc.** lycps-v. lyss. mag-m. mag-p. manc. mang. **Med.** melal-alt. meny. meph. merc-c. **Merc.** mez. **Mill.** mit. **Morg-g.** nabal. nat-ar. nat-ch. **Nat-m.** nat-p. nat-s. nat-sil. **Nit-ac.** nux-m. **Nux-v.** oci-sa. oci. ol-sant. oncor-t. orot-ac. ox-ac. oxyt. ozone par. **Pareir.** pen. petr. **Ph-ac.** **Phos.** phys. **Phyt.** **Pic-ac.** pin-con. pin-s. **Plb.** plumbg. plut-n. podo. polyg-h. positr. prot. ptel. **Puls.** ran-s. raph. rat. rheum **Rhus-t.** ruta sabad. **Sabin.** sal-fr. sang. santa. sarcol-ac. saroth. **SARS.** scroph-n. scut. **Sel.** **Senec.** **Sep.** sil. solid. spect. spira. spong. stann. **Staph.** stel. still. sul-i. **Sulph.** syc. symph. tab. **Tarent.** tell. **Ter.** thlas. **Thuj.** thymol. tritic-vg. tub. upa. urt-u. ust. **Uva** valer. vanil. vario. verat. vesi. **Vesp.** vip. visc. xero. zinc-p. **Zinc.** zing.

**STOMACH - THIRST - large quantities; for** abrom-a. acet-ac. **Acon.** **Agath-a.** allox. **ARS.** bac. bad. bamb-a. bapt. bar-i. bell. bism. **BRY.** bung-fa. calc. calen. camph. canth. carbn-s. carc. cassia-s. cephd-i. **Chin.** coc-c. **Cocc.** cop. cortisol. cystein-l. dulc. **Eup-per.** falco-pe. **Ferr-p.** ham. hir. iod. irid-met. jatr-c. kali-i. kali-s. lac-c. **Lac-d.** lac-leo. lil-t. lycpr. **Lycps-v.** melal-alt. **Merc-c.** merc-i-f. merc. **NAT-M.** nept-m. pant-ac. petr-ra. **PHOS.** pic-ac. plut-n. **Podo.** positr. ribo. ruta sacch. sal-al. sol-ni. spong. **Stram.** sulfonam. **SULPH.** taosc. thiam. **Thyr.** tritic-vg. tub. tung-met. vanil. **VERAT.** vip. xan. zinc-i.

**STOMACH - VOMITING - constant** amyg-p. ars. carc. hell. helo-s. ip. merc. plb. pyrog. syph.

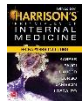
**URINE - COPIOUS** abrom-a. **ACET-AC.** **Acon.** adon. aesc. **Aeth.** **Agar.** **Agath-a.** agn. aids. all-c. all-s. allox. **ALOE** alum-p. alum-sil. **Alum.** alumn. am-c. **Am-m.** am-n. **Ambr.** anac. anan. androc. ang. **Ant-c.** ant-t. **Anthraci.** anthraco. **Apis** Apoc. aran-sc. **ARG-MET.** **ARG-N.** arizon-l. arn. ars-br. ars-i. ars-s-f. **Ars.** Arum-t. asc-c. **ASPAR.** aster. atro. aur-ar. aur-i. **Aur-m-n.** **Aur-m.** aur-s. **Aur.** bac. bamb-a. **Bar-c.** bar-i. bar-m. **Bell.** benz-ac. berb. **Bism.** bit-ar. bov. brach. brom. bry. bufo **Cact.** cadm-met. **Cain.** calc-f. calc-i. **Calc-p.** calc-sil. **Calc.** **Camph.** **CANN-I.** cann-s. cann-xyz. **Canth.** caps. carb-ac. **Carb-an.** carb-v. carbn-s. card-m. caru. caul. caust. cean. **Cedr.** cench. cham. **Chel.** **Chim.** **Chin.** chinin-ar. chinin-s. **Chlol.** chlor. cic. **Cimic.** **Cina** cinnb. **Clem.** cob-n. cob. coc-c. cocc. coch. **Coff.** **Colch.** coli. **Coloc.** **Con.** conv. cop. corv-cor. **Crot-c.** **Crot-h.** crot-t. cub. **Cupr.** cur. **Cycl.** cyt-l. **Daph.** **Dig.** dros. dulc. **Echi.** elaps elat. **Equis-h.** erig. ery-a. eucal. eup-per. **Eup-pur.** euph. euphr. eupi. fab. fago. falco-pe. ferr-ar. ferr-i. ferr-m. ferr-ma. ferr-p. **Ferr.** **Fl-ac.** flor-p. foen-an. form. gal-ac. gali. gamb. **GELS.** germ-met. gink-b. gins. glon. glycyr-g. gnaph. graph. grat. guaj. ham.

hed. hedy. hell-o. hell. helo-s. Helon. hep. hyos. Ign. ins. lod. ip. Iris jatr-c. junc-e. kali-ar. Kali-bi. kali-br. Kali-c. kali-chl. Kali-i. Kali-n. Kali-p. Kali-s. kali-sil. Kalm. kola **KREOS**. lac-ac. **LAC-C**. Lac-d. Lach. lact. lappa laur. Lec. **LED**. Lil-t. Lith-c. lob. Lyc. Lycps-v. lyss. m-arct. m-aust. Mag-c. mag-p. Mag-s. mang. marb-w. med. Meli. Merc-c. merc-i-f. Merc-i-r. **MERC**. mez. morph. **MOSCH**. **MUR-AC**. Murx. mygal. Nat-ar. **NAT-C**. nat-m. Nat-p. **NAT-S**. nicc-s. nicc. nit-ac. nux-m. Nux-v. oci-sa. Ol-an. olnd. op. opun-s. Ox-ac. oxyt. ozone pall. par. petr-ra. petr. Petros. **PH-AC**. phor-t. Phos. Phyt. pic-ac. pin-s. pitu-gl. pitu-p. Plan. Plb. plut-n. Podo. Prun. psor. ptel. **PULS**. Raph. rat. rauw. rheum Rhod. rhodi. rhus-g. **RHUS-R**. **RHUS-T**. Ros-ca. rumx. ruta sabad. Sabin. sacch-a. sal-al. samb. sang. sanic. santin. saroth. sarr. Sars. scop. sec. sel. Senec. Seneg. sep. sil. spartin-s. spartin. **SPIG**. spong. **SQUIL**. stann. Staph. stict. stram. stront-c. stroph-s. sul-ac. sul-i. sulfonam. **SULPH**. suprar. Syzyg. tab. Tarax. Tarent. tax. tell. Ter. Teucr. Ther. thiosin. Thuj. thymol. Thyrioid. trad. tril-p. tritic-vg. uran-met. **URAN-N**. valer. vanil. ven-m. verat-v. Verat. **VERB**. vib. Viol-t. vip. visc. yohim. zinc-p. zinc. zing.

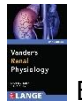
## Most common remedies for Bartter and Gitelman syndrome

Nat-m, Phos, Verat, Acet-ac, Aloe, Alum, Anac, Ang, Arg-met, Arg-n, Ars, Art-v, Aspar, Atro, Bar-c, Bell, Nez-ac, Berb, Bry, Bufo, Calc-p, Calc, Cann-i, Cann-s, Canth, Carb-an, Carbn-s, Caust, Cham, Chel, Chin. Cic, Cina etc...

## Bibliography



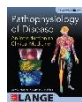
Acidosis and Alkalosis > SOLUTE LOSING DISORDERS: BARTTER'S SYNDROME AND GITELMAN'S SYNDROME Harrison's Principles of Internal Medicine



Basic Renal Processes for Sodium, Chloride, and Water>The Loop of Henle Vander's Renal Physiology, 8e ..., and the basolateral chloride channel lead, respectively, to the 3 different types of Bartter syndrome. ATP, adenosine triphosphate. Henle's loop as a whole reabsorbs proportionally more sodium and chloride (approximately 25% of the filtered loads) than water...



Chapter 50. Acid-Base Management Morgan & Mikhail's Clinical Anesthesiology, 5e ... Edematous disorders (secondary hyperaldosteronism) Cushing's syndrome Licorice ingestion Bartter's syndrome Severe hypokalemia Miscellaneous Massive blood transfusion Acetate-containing colloid solutions Alkaline administration with renal insufficiency Alkali therapy Combined antacid...



Disorders of the Adrenal Cortex Pathophysiology of Disease: An Introduction to Clinical Medicine, 7e... Renal tubular acidosis Juxtaglomerular cell hyperplasia (Bartter syndrome) Surreptitious vomiting or diuretic ingestion (pseudo-Bartter syndrome) Oral contraceptives Renin-secreting tumors (rare) Table 21-6 Typical plasma electrolyte levels in normal...



Electrolyte & Acid-Base Disorders > B. Laboratory Findings Current Medical Diagnosis & Treatment 2018... Urinary potassium concentration is low (less than 20 mEq/L) as a result of extrarenal loss (eg, diarrhea, vomiting) and inappropriately high (greater than 40 mEq/L) with renal loss (eg, mineralocorticoid excess, Bartter syndrome, Liddle syndrome) ( Table 21-3 ).



Encyclopedia Homoeopathica



Fluid, Electrolyte, & Acid-Base Emergencies > General Considerations CURRENT Diagnosis & Treatment: Emergency Medicine, 8e...Liddle syndrome Bartter syndrome Gitelman syndrome Fanconi syndrome Type I distal renal tubular acidosis Type II proximal renal tubular acidosis Diabetic ketoacidosis Medications (aminoglycosides, amphotericin, cisplatin) Cushing syndrome Primary hyperaldosteronism...



Humoral Manifestations of Malignancy > Etiology and Pathogenesis Greenspan's Basic & Clinical Endocrinology, 10e...Tumors are a common cause of SIADH (see Table 21-3). Bronchogenic carcinoma, particularly small cell carcinoma, has been associated with this syndrome since its initial description in 1957 by Schwartz and Bartter. Small cell carcinoma accounts for 80% of lung tumors associated with SIADH...



Kidney & Urinary Tract > HYPOKALEMIC ALKALOSIS (BARTTER SYNDROME, GITELMAN SYNDROME, & LIDDLE SYNDROME) CURRENT Diagnosis & Treatment Pediatrics, 23e ... There are a number of genetic tubular disorders which result in hypokalemic metabolic alkalosis. Bartter syndrome is characterized by severe hypokalemic, hypochloremic metabolic alkalosis, extremely high levels of circulating renin and aldosterone, and a paradoxical absence of hypertension...



Pharmacotherapy of Inflammation, Fever, Pain, and Gout > Bartter Syndrome Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13e ... Bartter syndrome includes a series of rare disorders (frequency  $\leq 1/100,000$  persons) characterized by hypokalemic, hypochloremic metabolic alkalosis with normal blood pressure and hyperplasia of the juxtaglomerular apparatus. Fatigue, muscle weakness, diarrhea, and dehydration are the main...



The Eicosanoids: Prostaglandins, Thromboxanes, Leukotrienes, & Related Compounds > Renal System Basic & Clinical Pharmacology, 14e... Increased biosynthesis of prostaglandins has been associated with one form of Bartter's syndrome. This is a rare disease characterized by low-to-normal blood pressure, decreased sensitivity to angiotensin, hyperreninemia, hyperaldosteronism, and excessive loss of  $K^+$ . There also...



The Posterior Pituitary (Neurohypophysis) > C. Clinical syndromes of SIADH Greenspan's Basic & Clinical Endocrinology, 10e ... producing chronic activation Other etiologies AIDS Marathon running or other strenuous exercise Acute psychosis The clinical criteria for SIADH remain those described by Bartter and Schwartz in 1967: decreased plasma osmolality; inappropriate concentration of the urine...



Radar 10